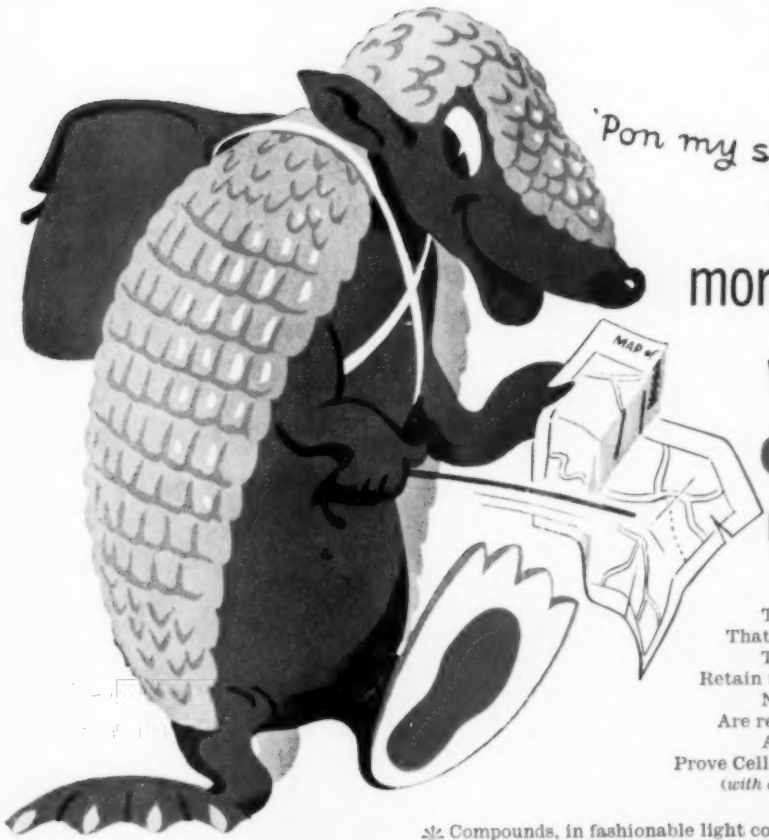
RUBBER and PLASTICS WEEKLY

VOLUME 140 NO. 18 MAY 6 1961 ONE SHILLING



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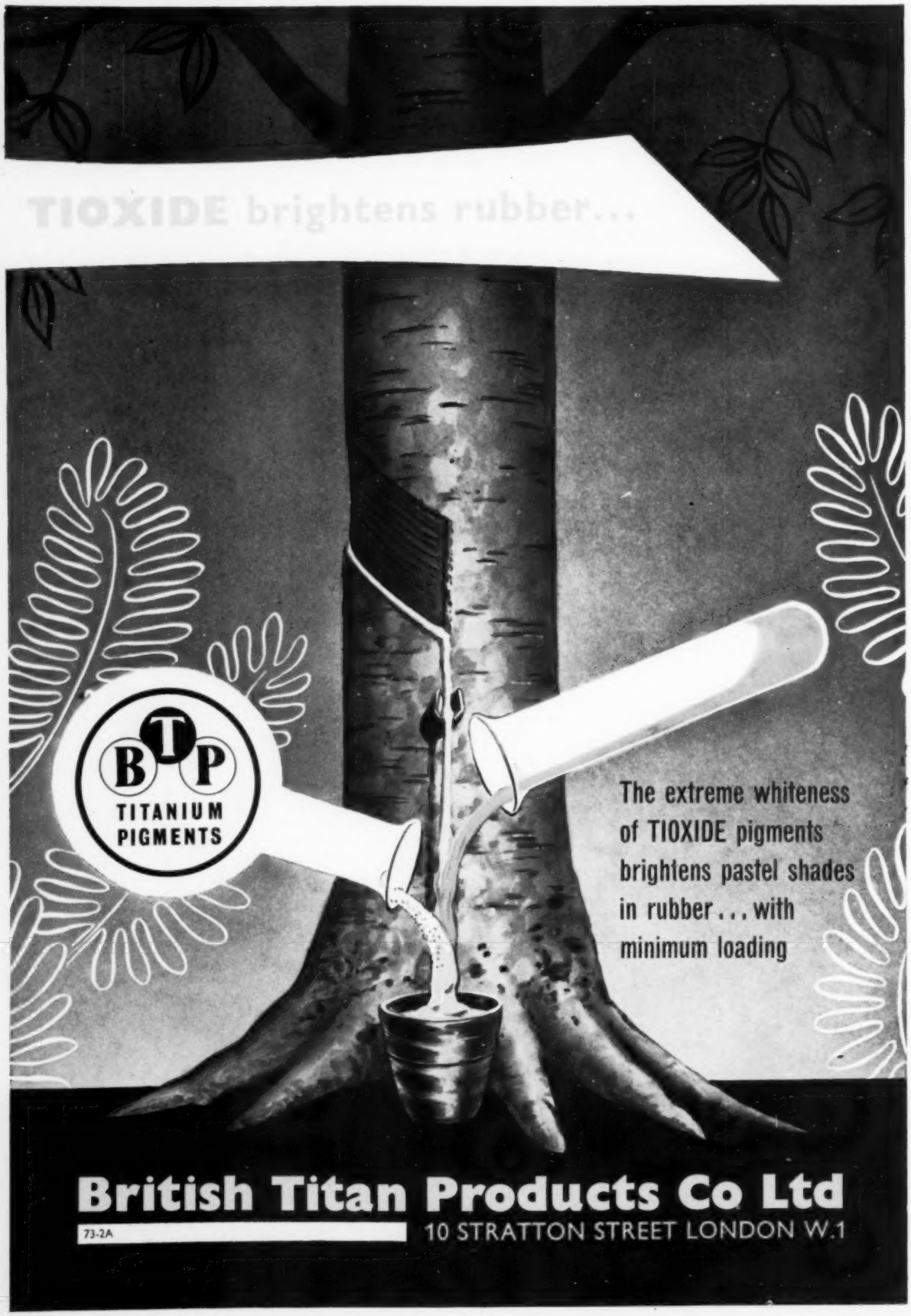
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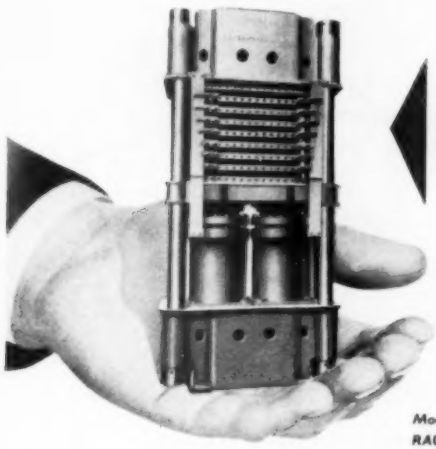
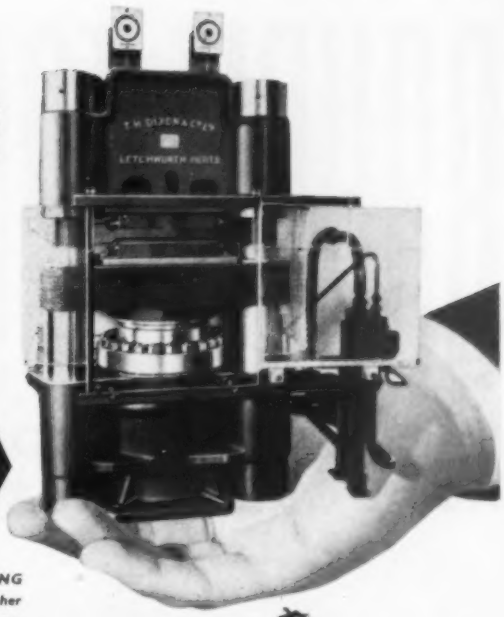


Model 810. DIXON HYDRAULIC MOULDING PRESS, MULTI DAYLIGHT. Steam-heated, total pressure 500 tons.



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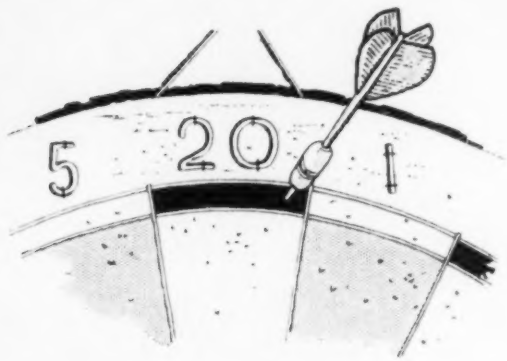
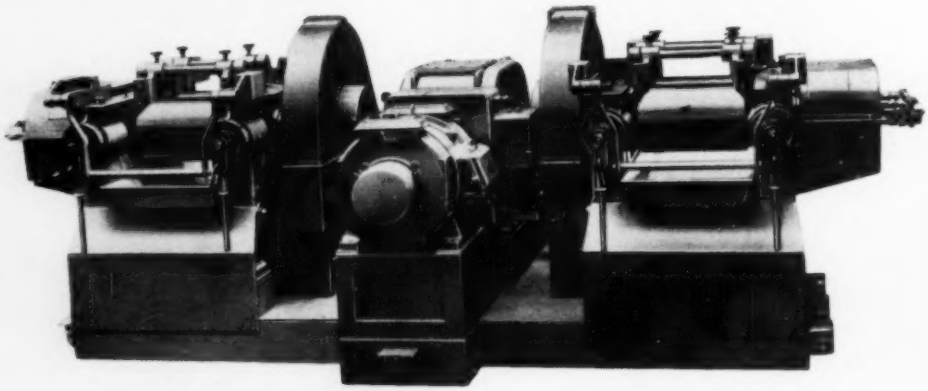
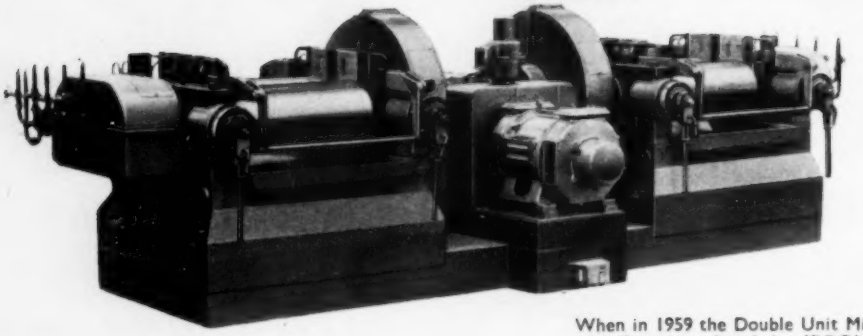
DOUBLE TOPS
DOUBLE TOPS



INCREASED PRODUCTION–
REDUCED SPACE REQUIREMENTS



C.E.12 Double Unit Mixing Mills with central drive mounted on steel sub-frame, fitted with vibro insulators. Rolls 16" dia.



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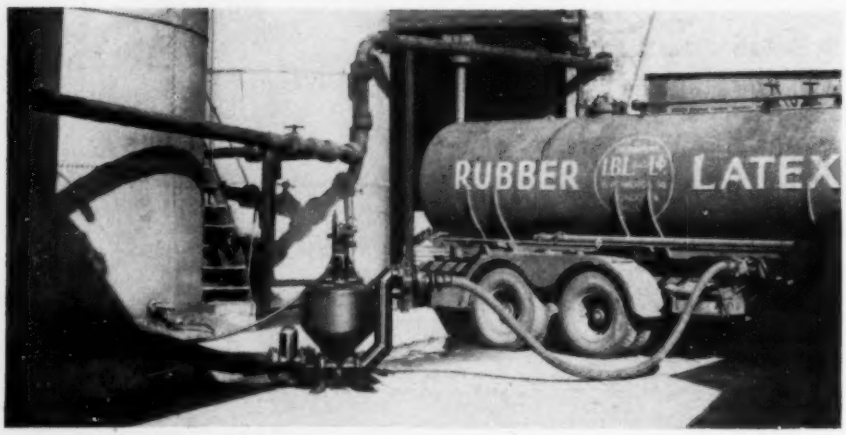

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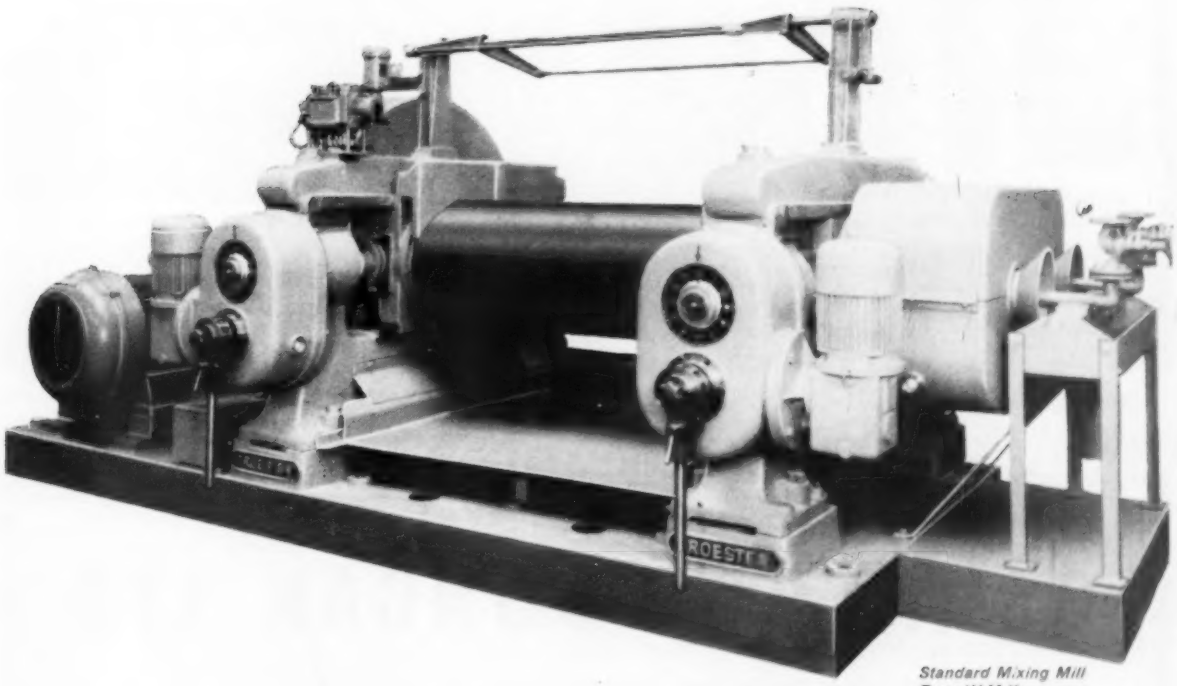

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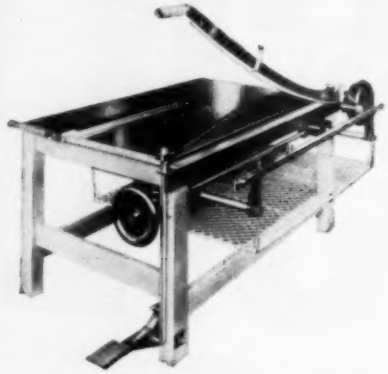

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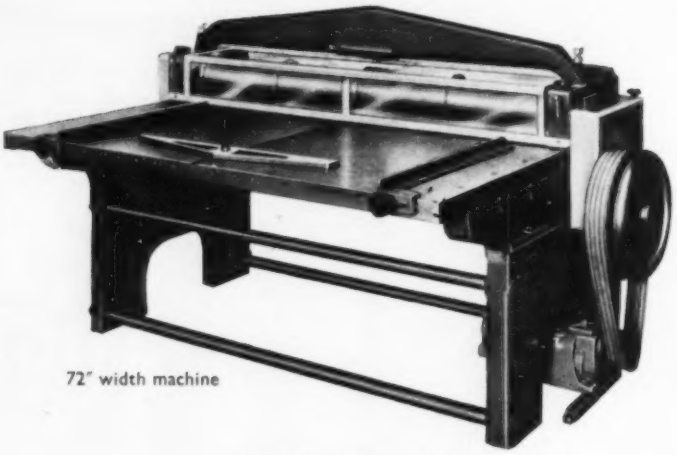

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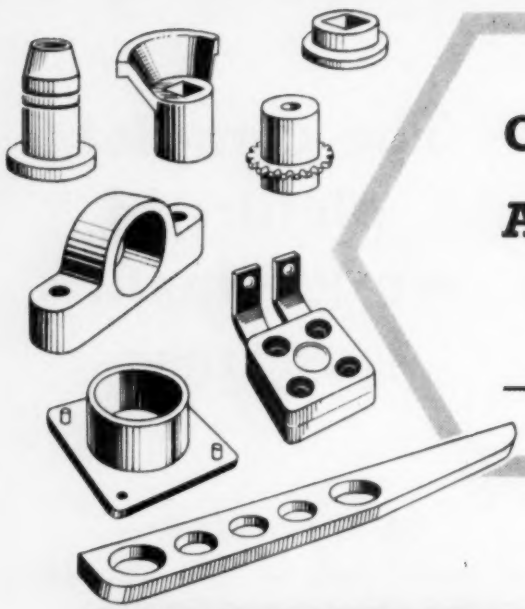

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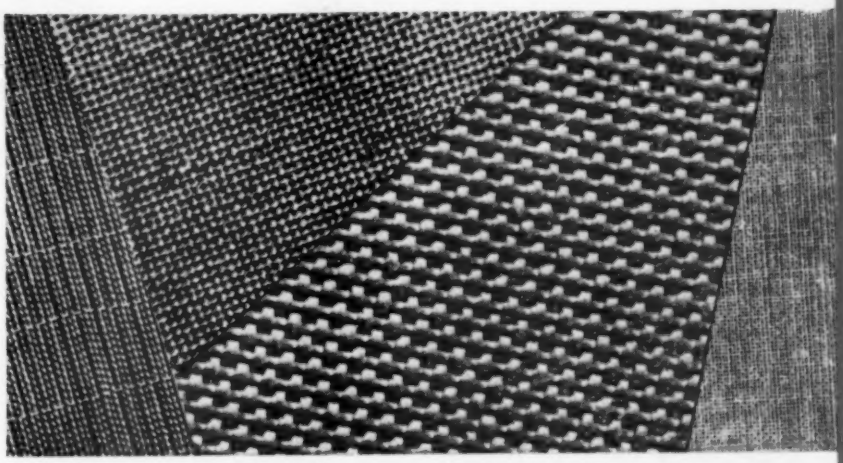

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RUBBER and PLASTICS WEEKLY

Formerly 'Rubber Journal and International Plastics'

Volume 140 IN ITS 77th YEAR No. 18

May 6 1961

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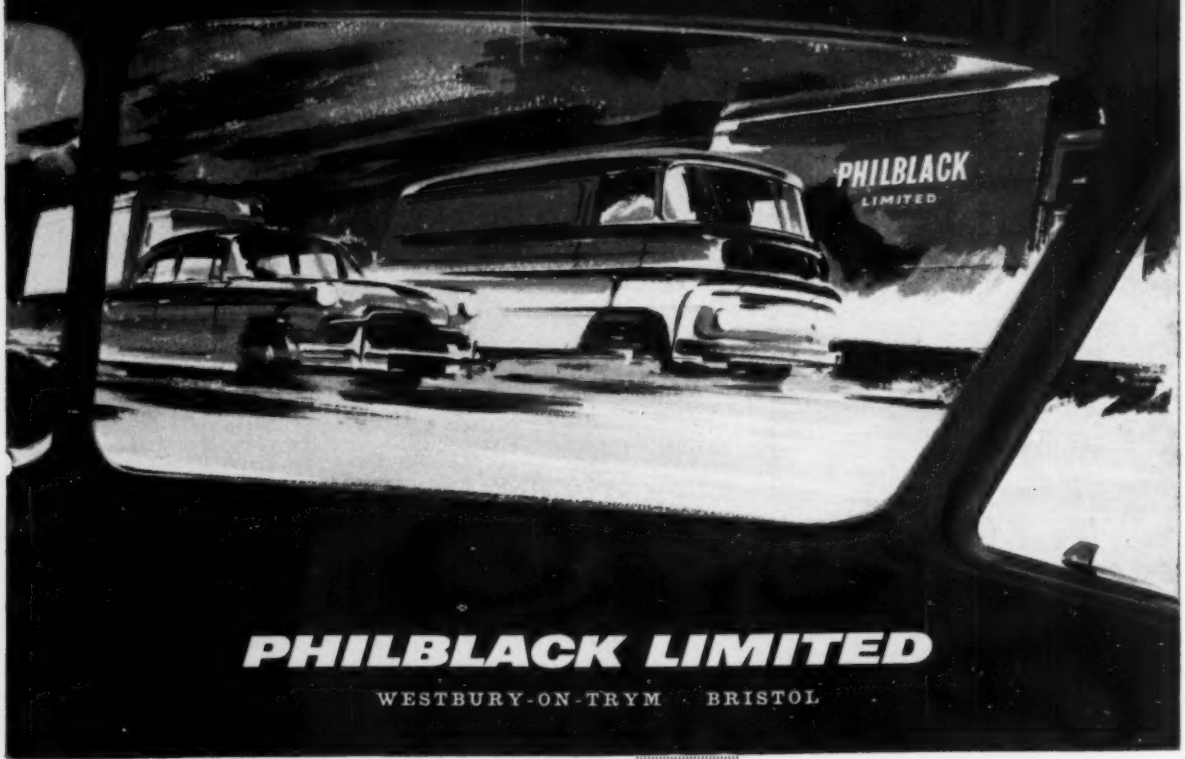

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NOTES of the WEEK

Training for Good Relations

BETTER training should be given to both sides entrusted with carrying out negotiating procedure in an industrial dispute. This point was stressed by the report on the recent unofficial strike at Dunlop's Speke works (*RPW* April 1, 496). Better training can be based only on sound information, and therefore the publication of a new revised edition of the Ministry of Labour's handbook on industrial relations* is a very welcome event. This does not advocate particular practices or procedures, but sets out essential facts about the organisation of employers and workers in Great Britain, explains how they negotiate, and about what, how differences are settled, what part is played by the Government, and how relationships at the place of work may be adjusted. Apart from general information there are good, concise sections on the plastics materials industry and rubber manufacturing industry — with more detail than in previous editions — summarizing negotiating machinery, agreements, and procedures for settling disputes.

Changes from the last edition take account of recent legislation — for example, the revocation of the Industrial Disputes Order and the passing of the Terms and Conditions of Employment Act, 1959 — and reflect alterations in perspective which have arisen with the passage of time, making it appropriate to give less prominence than hitherto to events before the war, to war-time policy and immediate post-war developments. An appendix giving an analysis of stoppages of work by industry since 1949 makes sorry reading; it clearly shows the steady increase in working days lost throughout the fifties. The figures for 1950, 1951 and 1952 were (in thousands of days): 1,389, 1,694, 1,792. In 1959 the figure was 5,270. No precise figures are given for plastics and rubber, but they are included in manufacturing groups with extremely low figures — a tribute to both the employers' organizations and the trade unions concerned.

A Solid Background

AN analysis in the handbook of the principal causes of disputes leading to stoppages of work yields some interesting figures. Although, as might be expected, wages disputes are the main cause (1,279 stoppages in 1957, 1,208 in 1958) they are closely followed by 'other working arrangements, rules and discipline' (1,078 stoppages in 1957, 1,106 in 1958). Examples of this latter cause are demarcation disputes, disputes arising from the employment of certain officials, and claims for the reinstatement of discharged or suspended employees. It is in this field where, by improving communication between management and workers, and by giving better training to people who have to handle negotiating procedures, we have a good chance of reducing the number of disputes. And, by providing a solid background of information for these activities, it is in this field that publications like the Ministry's handbook can do a very good job indeed.

*Industrial Relations Handbook. H.M. Stationery Office 5s. 6d.

The First Course

WHEN the first of the new general engineering courses announced in the recent White Paper 'Better Opportunities in Technical Education' starts in technical colleges this autumn, it should be closely watched by all personnel and training officers in the polymer industry. This two-year course, one of several measures intended to increase the supply of technicians — and improve their quality — is intended for boys of 15 and 16 who show promise of being able to go on to a national certificate, or a technician course. Further details of the scheme, and the syllabus, were issued this week. The scheme assumes that the student will spend 240 hours a year on the course, by means of block, day-release, or a sandwich course.

A good feature about the syllabus, from our point of view, is that it does cover 'a brief account of the properties and electrical uses of ebonite, moulded plastics, laminates and rubber and the use of catalogues and tables for general information on these'. Even so, it looks as if polymers will only receive a cursory glance. We would have thought that, although such a syllabus obviously has to be prepared on the very broadest basis, more could have been included on rubber and plastics. First principles can often be explained with one class of material as well as another.

One problem of technology — which is particularly acute at the technician grade — is that, although a man may be competent enough to gather the material together for a report, he is frequently unable to write it. The new course recognizes this, and the syllabus includes a section : 'English and General Studies'. How this will work has not yet been decided — there is plenty of scope for new ideas in this field — but this is thinking in the right direction.

Perhaps the most important single factor about the course is the initial selection for it. Most technical courses suffer a high 'wastage rate'. Care in selection will be the job of the college, but the first session can be regarded as a 'diagnostic' period, and here the employer has a strong responsibility — both to keep a close contact with the college, and to encourage his young employee.

NEWS *Briefs*

US 'POLYTHENE LATEX' PLANT — GOODRICH ACTIVITY IN IRAN AND CANADA — EMERGENCY IN CEYLON—ORANGE PLASTICS—SD CONTRACT

●**Hungary** — The new headquarters of the Enterprise for the Designing Chemical Works are being built at a cost of 26m. forints. The building will be made of glass, and all the successful products of the Hungarian plastics industry will be employed in its construction.

●**India** — Union Carbide India Ltd., which recently completed a £3.4m. expansion programme, proposes to embark on a new and bigger expansion plan, anticipating an outlay of over £6m. The company has submitted to the Union Ministry of Commerce and Industry a scheme to treble its production of organic chemicals, and to step up its polythene capacity from 6m. lb. to 20m. lb. a year.

●**Russia** — Russia and Hungary have concluded a £6m. trade agreement for 1961. Under it Russia is to deliver raw materials and goods to Hungary in exchange for manufactures, including plastics goods.

●**United States** — The Spencer Chemical Co. is building a plant at Calumet City, Illinois, for the production of a new product, polythene latex. The facility will have a capacity of over 20m. lb. of latex. The plant will cover approximately 14,000 sq. ft. and will cost 'more than one million dollars'. Construction started this week and completion is scheduled for the end of the year.

●**Ceylon** — The Government has declared that, under the emergency regulations now in force all work related to the planting, manufacturing or production of rubber is an essential service and that any strike would be illegal.

●**Canada** — Site breaking has commenced at Kitchener, Ontario, for the construction of a multi-million dollar, 250,000 sq. ft. tyre plant to be erected by B. F. Goodrich Canada Ltd.

●**United States** — Du Pont will start construction soon on a multi-million dollar plant at Orange, Texas, which will produce high-pressure polythene and a new product, Elvax vinyl resin. The plant, which is scheduled for completion in the third quarter next year, will raise the company's over-all polythene capacity to nearly 400m. lb. a year. Elvax vinyl resins, copolymers of ethylene and vinyl acetate, are designed primarily to add toughness, flexibility and adhesion to paraffin wax and other brittle, low molecular weight materials. The company expects the resins to increase the use of wax in the paper, packaging and adhesive industries.

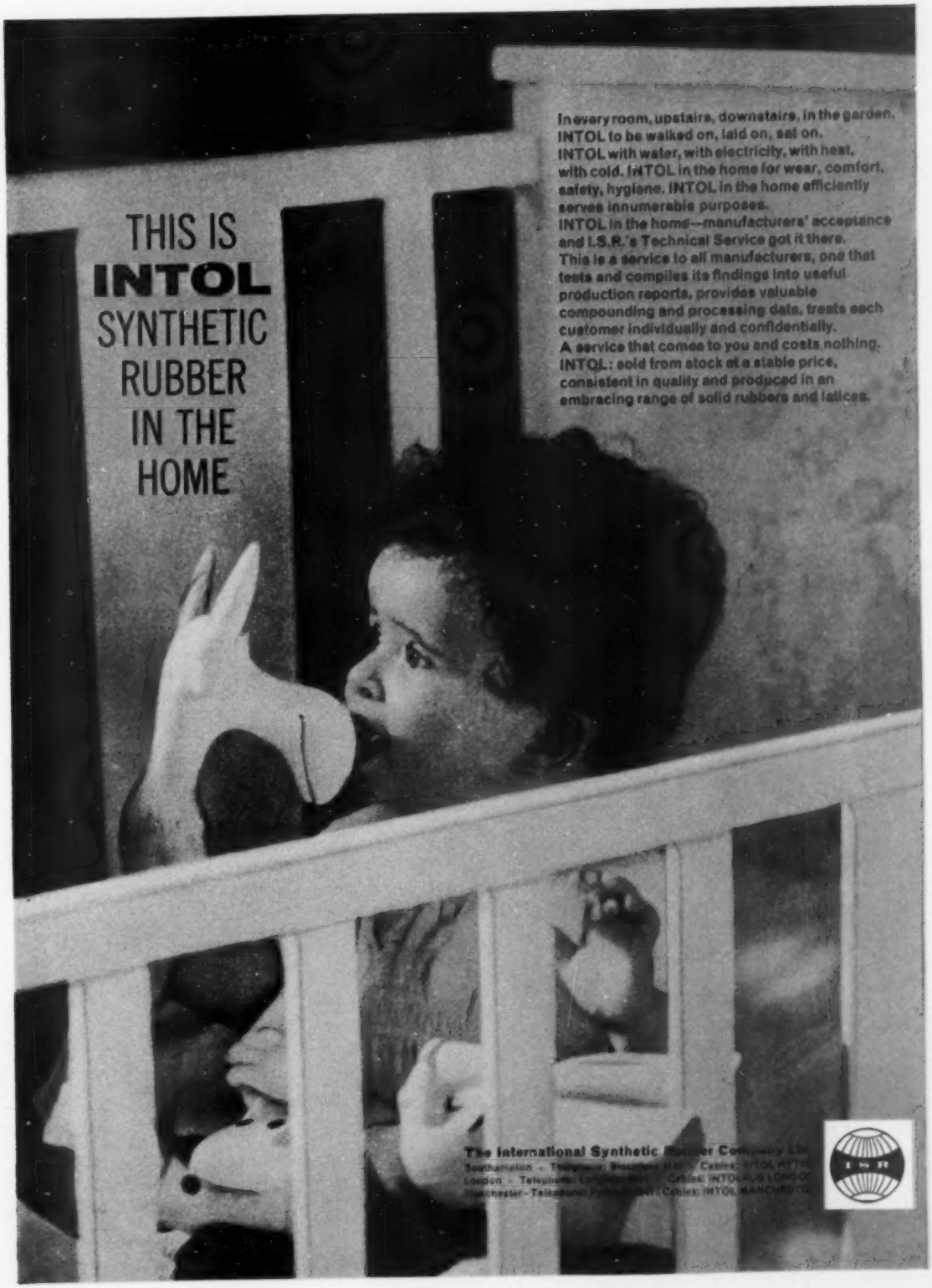
●**Nigeria** — Turner and Newall is to build a factory in the Eastern region of Nigeria which will produce, eventually, 17,000 tons of asbestos products a year. The market will include the Eastern, Northern and a large part of the Western Region of Nigeria. The new factory will cover 120,000 sq. ft. in a site of 16 acres.

●**Italy** — Bombrini Parodi-Delfino SpA has awarded an engineering contract to Scientific Design Co. Inc. for a maleic anhydride plant to be built at Colleferro, Italy. The 10m. lb. a year plant will use Scientific Design's process based on air oxidation of benzene and is expected to be completed by mid-1962. The Italian company manufactures explosives, nylon-6, phthalic anhydride, and detergents.

●**India** — The Mansfield Tyre and Rubber Co. is to help establish and become part owner of a multi-million dollar tyre manufacturing enterprise in Madras. Negotiations have been completed for approximately 20% of the capital stock of Madras Rubber Factory Ltd., one of India's largest producers of tread rubber. Madras Rubber is entering the tyre manufacturing field. The US Export-Import Bank on April 21 granted the Indian Government a credit extension for a $2.5m. loan to Madras Rubber for the purchase of American-made machinery and technical service, and for use as working capital.

●**Iran** — Production began this week in a $7m. tyre plant near Teheran, owned by B. F. Goodrich Iran, SA, a subsidiary of B. F. Goodrich of Akron, Ohio. J. W. Keener, president and chief executive officer of the parent company, who attended the opening ceremonies, pointed out that the plant was built in association with a group of prominent Iranian investors. 'This plant', Mr Keener said, 'provides a concrete example of the right kind of cooperation between American private enterprise and local investors in promoting the progress of one of the world's developing economies'.

'It's these damn plastic things — thirty years ago when we used vulcanite combs, I had a lovely head of hair!'
— 535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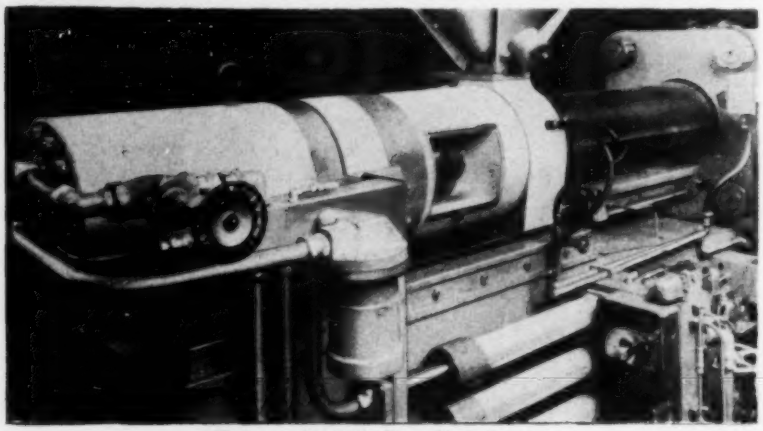
I S R

Rotothrust in Czechoslovakia

FIRST EAST EUROPEAN ORDER FOR PECO'S NEW RANGE

PECO Machinery Sales Ltd. has gained its first East European order for machines in its new Rotothrust range of injection moulders. J. A. Baldry, sales director, returned from Czechoslovakia this week with a contract worth £40,000. This is for four 40MR Rotothrust screw preplasticizer machines. The contract is the latest of a series of orders obtained by Peco from Czechoslovakia.



Drive unit of the Peco Rotothrust

Quick Response

The Rotothrust range was introduced only a few months ago, and has met with a quick response from the industry. A number of models will be shown for the first time in operation at an exhibition at Europlastica, Ghent (June 16-25), but the first showing of the complete range will be at the Interplas International Plastics Exhibition (June 21-July 1).

The Rotothrust models offer a wide range of shot weights from 2-178oz. with appropriate clamping forces from 80-750 tons. Alternative screws are available for each model affording maximum flexibility and giving pressures on the material of from 9,000-18,000psi.

A universal screw and head is available for each diameter screw, the design allowing for maximum injection pressure with minimum material flow-back. All barrels are fitted with an 'X-Alloy' corrosion resistant liner.

The units are powered by a unique form of hydraulic drive eliminating the need for thrust bearings and enabling the screw to be turned and reciprocated by the same unit within the hydraulic circuit of the machine. All units are coupled to a Peco toggle clamp and tie-bar system with central mould adjusting screw.

Reichhold Chairman Killed in Car Crash

W. H. Breuer, chairman and joint managing director of Reichhold Chemicals Ltd., was killed in a car crash in Germany last week.

Mr Breuer was appointed chairman of the company on its formation in 1952: he had previously been closely associated with the Beck, Koller Co. for many years. As the executive vice-president for European affairs of Reichhold Chemicals Inc., USA, he had undertaken, during the last few years, increasing managerial responsibilities on the Continent. He leaves a widow and a son, who have already received many messages of sympathy from colleagues and friends in the industry.

Companies in the Reichhold group include Vinatex Ltd., and Vinyl Products Ltd., manufacturers of pvc pastes, sintering powders and other products.

G. S. Bache, joint managing director of the company, has been appointed acting chairman.

SILCOSET NEWCOMERS

I.C.I. Nobel Division has added a further two products to its range of Silcoset silicone rubbers. These rubbers, which cure at room temperature, were first introduced in 1960.

Silcoset 103 is a white solvent-free paste that cures at room temperature to a resilient silicone rubber after addition of the appropriate curing agent. This rubber, similar in properties to the pink Silcoset 100, introduced in 1960, is recommended for high temperature sealing, patching, caulking, potting and the encapsulation of sensitive electronic assemblies. Dissolved in a solvent it can be sprayed, and cloth may be coated by spraying or dipping.

Silcoset 104 is thixotropic, with flow properties that are said to make application from a caulking gun 'eminently satisfactory'. This rubber, which can be readily bonded to primed metal surfaces, is claimed to be especially suited for sealing, patching and caulking when a room temperature cure is necessary.

Durapipe to Sell PVC Cement

Sole UK selling rights for a pvc solvent cement used by Durapipe and Fittings Ltd. in all its thermoplastic pipe installations have been acquired by the company under arrangements made with the manufacturer, Progressive Finishes Ltd. of Northampton.

The cement, which will be marketed under the name Durapipe pvc solvent cement (No. 45), is to be sold in 45-gallon and 5-gallon drums; and in 1-gallon, 1-pint and half-pint tins.

Flooring for Justice

Semtex Ltd., a subsidiary of the Dunlop Rubber Co., is now carrying out a large installation of rubber flooring at the new Manchester Courts of Justice.

The contract, which involves 45,000 sq. ft. of flooring, will be completed in time for the official opening of the Courts of Justice this month by Her Majesty the Queen.

Leipzig Contracts

British firms concluded contracts worth £5.4m. with East Germany at this year's Leipzig Spring Fair, compared with £3.6m. at the 1960 Spring Fair. British purchases totalled £4m., and East German orders from Britain came to £1.4m. The latter included orders worth £68,000 placed with R. H. Windsor for injection moulding machinery.

Tailored for Space

RUBBER/NYLON SUITS FOR AMERICAN ASTRONAUTS

THE American Project Mercury astronauts are wearing special nylon/rubber space suits developed at the B. F. Goodrich research centre, at Brecksville, Ohio.

Within specially developed chambers, BFG research specialists have approximated the vacuum conditions of space and, for what is believed to

B. F. Goodrich has developed a series of dynamic physical tests on organic materials in high vacuum. Testing machines actually operate within vacuum bell jars, as pictured. Samples tested include special nylons, glass, rayons, and various rubber and plastics compounds

be the first time, have been service testing fabrics and other materials in high vacuum approaching that of outer space. Each piece of equipment requires moving parts in a vacuum to determine the tensile strength, abrasion and flexing characteristics of materials tested.

The test methods developed, according to Dr Frank K. Schoenfeld, BFG's vice-president of research and development, are the only valid means of determining the way a material will behave in space without actually rocketing it into orbit. Space suit materials tested by the new procedures include special nylons, glass and rayons and various plastics and rubber compounds.

'While the hazardous effects of vacuum on man are well understood, very little is known about the effect of vacuum on non-metallic substances', Dr Schoenfeld said. 'The absorbed air present in fibre, rubber and plastics materials, for example, "outgasses" under vacuum conditions, seriously limiting the usefulness of some materials. Many materials lose volatile ingredients and undergo drastic changes in physical properties'.

Indicating the problems overcome in developing the new high vacuum dynamic test apparatus, Dr Schoenfeld said that most liquid lubricants rapidly evaporated under such conditions and even graphite, an excellent lubricant under atmospheric conditions became an abrasive when vacuum removed its absorbed moisture.

The B. F. Goodrich Co.'s interest in the development of high altitude and space suits began in 1934 when it created the world's first high altitude suit.

New Firestone Company

Firestone Tyre and Rubber Co. Ltd., of Brentford, Middlesex, has formed a new company, Firestone Burleigh Marine Pneumatic Fendering Co. Ltd., which will develop and produce all types of marine rubber fendering including pneumatic fendering. Directors of the new company are A. D. Wenzel, W. Young and Wing Cmdr. Burleigh.

For some time Firestone has been actively engaged in the production and supply of rubber fenders for ships and for dock and harbour installations. More recently, the company has been associated with Marine Craft Constructors Ltd., in a new development in the field of pneumatic fendering.

Some months ago special trials took place, off Heysham Harbour, using large Firestone ship-to-ship fenders.

BTR Develops Inflatable PVC Framework

BTR Industries Ltd. has developed its Plastidry hose as high-pressure inflatable framework for the support of temporary or permanent structures. Four lengths of this tubing — of 4in. bore and 24ft. span —will support the roof of the company's stand at the Interplas international plastics exhibition at Olympia (June 21).

Developed in co-operation with The Walter Kidde Co. Ltd. of Northolt, Middlesex, the application involves the use of individually sealed lengths of inflated Plastidry tubing as support members, bolted together to form a framework of the desired configuration. The framework is covered with pvc-proofed nylon.

These structures, said to be suitable for use in any climate, are extremely rugged and can be easily and quickly erected using either a portable air cylinder, a manual or power operated compressor, or a small foot pump. The Plastidry struts — manufactured from a nylon or Terylene woven reinforced fabric to which is fused a cover and lining of pvc compound — will maintain the working pressure for a period of 12 months or more without attention. Should any section be damaged, the design is such that individual struts can be withdrawn for repair or replacement without dismantling the structure. When deflated and dismantled the whole structure can be packed quickly and compactly for easy transportation.

Pipe-sealing Balloons

Special inflatables for use by the UK Atomic Energy Authority in sealing gas pipelines while maintenance work is in progress have been developed by George MacLellan and Co. Ltd., the Glasgow rubber manufacturers.

The balloons, nine of which have been supplied to the Authority, are 54in. in diameter and made of strong rubberized material. When inflated they effectively seal off any section of a pipe requiring attention. As heat is present, the balloons have been fitted with special release valves to allow for air expansion.

Freeman Adds to Range

William Freeman and Co. Ltd., the manufacturers of 'Freeflex' blown polythene containers, which includes capacities from 5cc to two gallons, has added a five-gallon capacity container in high density polythene, complete with carrying handle, to its range.

This container, despite its size, is said to be extremely rigid and will provide strong competition to containers of similar capacity made from conventional materials.

The company's new works at Staincross, Barnsley, which were opened in December 1960, are now in full production. The works includes a fully equipped engineering shop, and research and testing laboratories.

Stockpile Disposals

Sales from the UK Board of Trade's stock of natural rubber in April totalled 500 tons, for delivery as follows: May delivery 275 tons; June delivery 125 tons and July delivery 100 tons.

A total of 27,105 tons of rubber remained available for sale on May 1.

Reinforced Epoxy Piping

EXTENSIVE TESTS IN VARIED ENVIRONMENTS

Standard 20ft. length of Epoch pipe. Diameters up to 6ft. are to be produced

THE Epoch pipe system introduced at the end of last year by Bristol Aeroplane Plastics Ltd. was specifically designed to meet the needs of industry for large bore, highly corrosion-resistant pressure piping. Apart from the obvious importance of this development from the point of view of potential users of pipes of this type, it has attracted some considerable attention by virtue of the methods of production developed. Mechanization and control of the manufacturing process have been developed to ensure consistency of the finished product and to enable a high rate of production to be maintained.

Automatic Production

The pipes are produced in standard 20ft. lengths of various diameters. Steel mandrels are fed on a conveyor through pre-heat ovens to be placed in turn in the winding machine. Here the various layers of acrylic fibre and glass filament are rapidly wound onto the mandrel and at the same time are impregnated with hot epoxy resin. The mandrel is then lifted out of the machine and conveyed through curing ovens, cooling units and machines which part off the ends of the pipe, prior to being placed in the extraction machine. When the mandrel has been removed, it is returned to the manufacturing circuit and the pipe moves on to a further machine where the ends for joint attachments are machined accurately to size.

All conveying and handling of mandrels and pipes is automatic and the whole process is very closely controlled. The actual winding sequence carried out on the pipes is controlled by a punched card system with automatic feed back which ensures accuracy of manufacture. The impregnation of the fibres is also automatic and no operatives come into contact with the resin or have any direct hand in any of the operations through which the pipe passes.

Apart from trials in the company's Test Laboratories, close co-operation by the Admiralty and a number of industrial concerns has proved Epoch Pipe under true environmental conditions, and has determined its resistance against corrosion and abrasion, performance at elevated and sub-zero temperatures, and its non-toxic qualities. Details of some of these tests are given below.

High Speed Flow

Foremost of these tests was a high-speed flow test to ascertain bore wear from unfiltered sea water.

Using a length of 6in. diameter pipe mounted in a flow rig, water with a high salt content was pumped through for a sustained period at a velocity of 30ft. per sec. Subsequent inspection revealed only superficial wear of the bore.

Unfiltered sea water with a high grit content was then pumped through for some 1,400hr. while frequent bore measurements were taken although these revealed no further wear.

In contrast, steel pipe used during the same tests in regions of comparatively low velocity, sustained severe internal pitting up to ¼in. deep.

Throughout the test period, flow velocities were three times higher than normal for the particular application; in fact, a comparable test using conventional pipework would have resulted in severe internal erosion.

A point worthy of note is that many sea-going vessels are restricted in operation by the flow velocities permitted in certain pipe systems, and it is indicative that Epoch pipe can be operated at considerably greater efficiency and with longer life than piping in current use.

Chemical Resistance

Two trial lengths of 6in. bore pipe were installed in an ammonium sulphate plant during February 1961.

One length is conveying unsaturated ammonium sulphate liquor, 53gm./100ml. concentration, with free ammonia content of .10gm./100ml. at a temperature of 70°C. to 100°C. and pressure of 15psig.

The other length is conveying saturated ammonium sulphate liquor containing 5% by volume of solids. Traces of arsenic, alumina, lissapol, and sodium chloride are present, and an acidity of .35gm. H_2SO_4/100ml. also exists. Working temperature is 80°C. with pressure at 15psig.

These lengths are operating satisfactorily, although insufficient running time has elapsed for full inspection and evaluation.

Town Gas

Sample laminate specimens taken from Epoch pipe were subjected to immersion tests in aromatic oil condensate, which is a feature of town gas. This condensate, containing benzene, toluene, and xylene totalling approximately 1%, rapidly attacks conventional jointing materials. There was no effect on the bore of the specimens, which has raw unsealed edges. This latter unrepresentative feature was probably responsible for the minor weight increases experi-

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OVERSEAS AGENTS THROUGHOUT THE WORLD

P4377

enced. A 120ft. river crossing, using a catenary system, is under consideration for trial purposes.

Styrene Plant

Sample laminate specimens taken from Epoch pipe were submitted to a subsidiary of a leading petroleum company during January 1961 for immersion tests in the cooling unit of a monomeric styrene plant. The lines to the unit convey saturated gases of benzene, ethyl benzene, polyethyl benzene, ethyl chloride and aluminium chloride, together with approximately 1% hydrochloric acid condensate, at 20psig and temperatures of 70°C. to 100°C.

The line is at present fabricated from 99% comm. pure nickel and leakage due to corrosive effects was experienced within 15 months of installation.

The results of the immersion tests show that the reinforced plastics pipe would be a satisfactory replacement for nickel.

Papermaking

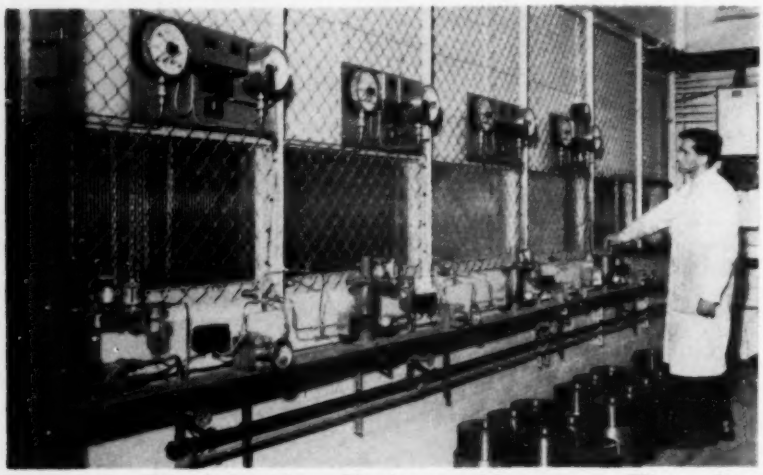
A trial length of pipe was installed in a paper mill for conveying wood pulp with nine times its volume in water at approximately 60psig. With the previous stainless steel installation an extension of operating conditions from 40°C. to 60-75°C. and an increase of water salinity at the source from 8ppm to 12ppm magnesium salts, had resulted in serious weld corrosion within three to nine months of installation.

The trial length, which was installed during September 1960, with two 90° bends in February 1961, are fully satisfactory and inspection of the pipe has shown no evidence of change.

Other tests which have been carried out include one to determine the suitability of reinforced plastics pipe for use in possible fire areas aboard ship in which it proved satisfactory when protected with asbestos lagging.

Trial lengths are also undergoing test in chemical plants carrying sulphur dioxide, sulphuric acid and sodium chloride brine and an evaluation is about to begin on an evaporator rig carrying abrasive sea water of high salinity in the Arabian Gulf.

Encouraging results have also been shown in the use of these pipes for carrying aviation fuels.



Part of the Bristol Aeroplane Plastics test laboratory at Filton where Epoch pipe is tested to twice its normal operating pressure over sustained periods

Low Temperature Tests

A pipe length has been subjected to a temperature of −80°C. with no apparent signs of deterioration and another, complete with end flanges, has been placed in an environmental chamber, filled with water and subjected to an ambient temperature of −20°C., one end of the pipe being open to the chamber environment. After 4½hr. exposure, with the water temperature at 0°C. dimensional checks were taken. Diameter change varied from −.002in. to −.006in., whilst an elongation value of −.15in. (on approximately 72in.) was established. On return to room temperature the pipe re-assumed its normal dimensions.

A series of laminate tests to −193°C. are currently being conducted to assist in assessing the capability of the pipe for the transmission of liquefied gases and similar applications.

To date sample laminations have been tested at −160°C. and a tensile strength of 48,000psi accompanied by approximately 30% change in modulus has been recorded.

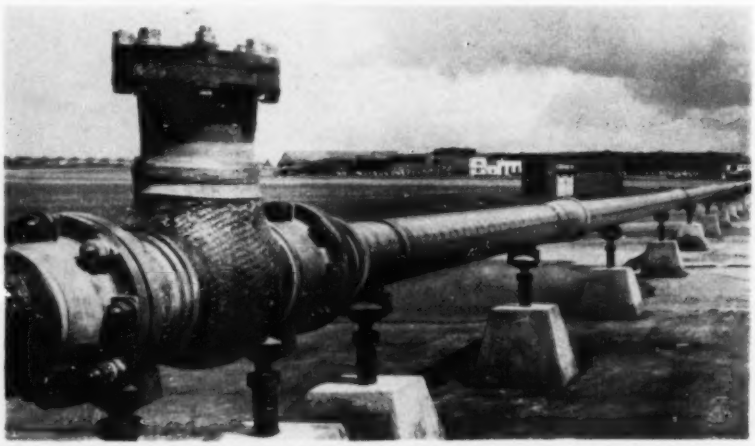
Audio Testing

In the Bristol Aeroplane plastics test laboratory at Filton, exhaustive tests have been carried out on the pipe under pressure and at elevated temperatures.

Normally, the results of such tests would have been evaluated only from gauge readings, but a method of audio-recording has been developed by Bristol's engineers.

This entails fitting special microphones on the wall of a sealed test specimen and connecting them to a tape recorder. Hydraulic pressure is then applied inside the pipe and, at progressive increments, read into a separate microphone, also wired to the tape recorder.

As pressure is increased to well above the pipe's normal operating pressure, the straining and eventual breakdown of individual fibres is audibly recorded.



An installation of 6in.-bore piping with bonded joints. A standard flange-jointed tee is shown in the foreground

By recording the frequency of the breakdown of individual fibres it is possible to ascertain the pressure under which a general breakdown is precipitated, although even far beyond this stage, specimens of pipe have continued to maintain full pressure, until ultimate failure.

In one instance a cast iron test flange failed and it was possible to distinguish the sound of this metallic failure from the resulting stressing of the reinforced plastics material.

Long Term Tests

Several bonded and bolted joints are under continuous pressure test in the Bristol test laboratory to assess long term behaviour. Test levels of 100, 200, 400 and 600psig are maintained by a pneumatic/hydraulic test circuit.

These specimens have been under continuous pressure for upwards of 7,000hr. and there has been no evidence of leakage or other adverse effects.

From the tests carried out so far it is evident that this high pressure pipe system has a potential market in a wide field and is establishing yet another major application for plastics as a replacement for metal.

IRI News

Tyres on the Motorway

AVAILABLE tyre statistics on the M.1 are conflicting, but it seems clear that in most cases any tyre trouble is due to use of tyres which are in poor condition, or of unsuitable type for the motorway. But despite the conflicting factors, the motorways can be regarded as the tyre's best friend, because of the absence of many forms of tyre wear associated with conventional main roads, said L. J. Mountford, manager of the Dunlop tyre performance division, at a recent meeting of the Midland Section of the Institution of the Rubber Industry at Wolverhampton.

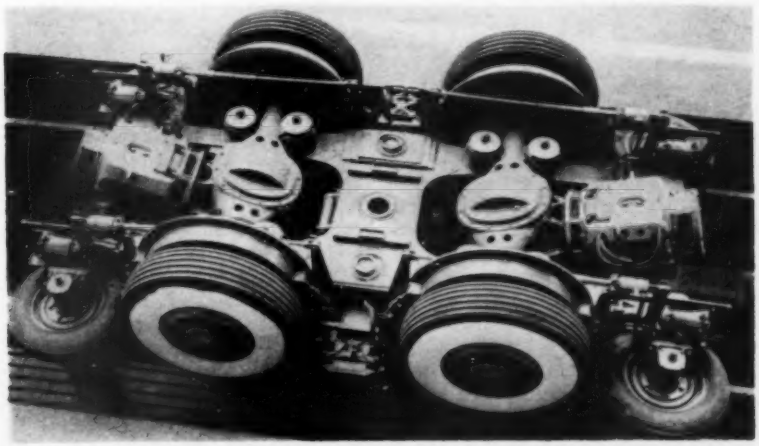
Not Representative

Mr Mountford was reviewing information collected during the 18 months the M.1 had been in use. He pointed out that this was not representative of general motorway conditions since the M.1 had not yet seen a long dry summer with high tyre temperatures, that it was only 70 miles long and that the increasing mileage of UK motorways coming into use would result in advanced car developments which would be harder on tyres.

An analysis of heavy vehicle speeds on the M.1 indicated that high speeds, leading to high tyre temperatures, were common. Tyres suitable for these conditions were available and few heating failures had been reported. He said that at the moment the tyre situation could be regarded as well under control and that operators should realize that, if correct tyre conditions were maintained, there were no problems the tyre manufacturers could not solve readily.

Consolidated Zinc

The Consolidated Zinc Corporation Ltd. is to move to 6 St. James's Square, London, S.W.1, on May 23.



Pneumatic-tyred underground coaches are being used on a section of the Paris Metro. Pictured is a bogie assembly used on these rubber-tyred trains. The horizontal wheels at extreme right and left are guide wheels, pressing against the inside faces of low side walls or walings

INTERIOR TREAD PATTERN

Firestone Tire and Rubber Co. of Akron is to produce tyres with a tread pattern on the interior as well as the exterior.

The interior pattern is said to be the result of a new tyre curing process that utilizes an engraved bladder to ensure uniform contact pressure over the inner surface of the tyre during moulding. This geometric pattern on the exterior surface of the bladder is attained by means of a photo-engraving process.

'For many years Firestone and the rest of the tyre industry have searched for a technique that would permit air to escape more effectively from between the bladder and the tyre during this moulding process', said J. J. Robson, Firestone's director of tyre engineering and development.

'Now Firestone will use an engraved bladder that will allow any air trapped between the bladder and tyre to escape through the patterned channels. This eliminates the possibility of ply separation caused by trapped air being driven into the cord body of the tyre during the curing process'.

UK Agency for Berk

Products of the Dutch associated companies Kunstharsfabriek Synthese NV and Remmert-Holland NV are to be marketed in the UK by F. W. Berk and Co.

The first of these two companies produces a wide range of synthetic resins for surface coatings and printing inks. HD nitrocellulose chips and a range of polyester pigment pastes are also available. A complete series of pigments including dry organics and inorganics and water dispersable pastes is manufactured by Remmert-Holland, for colouring all types of emulsion paints.

Adhesives Chairman

At the annual general meeting of the British Rubber and Resin Adhesive Manufacturers' Association, N. G. Bassett Smith (Dunlop Rubber Co. Ltd.) was elected chairman for 1961-62. Dr H. Simon (Evode Ltd.) was elected vice-chairman.

Amsterdam Moves

Amsterdam and London Engineering Co. Ltd., agents for MOI of Milan, blow moulding machinery manufacturers, has moved to Foundry Lane Estate, Horsham, Sussex.

The company is retaining its old premises at 42 Charles Street, Barnes, for use as a warehouse.

A monthly review of important papers on polymers published in the European technical press

European Technology Review

HIGH TEMPERATURE MIXING—A NEW POLYISOPRENE—NITRILE RUBBERS

By S. H. MORRELL and R. J. MOSELEY, Rubber and Plastics Research Association of Great Britain

PROBLEMS connected with the high-temperature mixing of rubber have been investigated[1] by the Bayer laboratories at Leverkusen. The problems originated with the observation that tread stocks containing sulphenamide accelerators cured more slowly after storage, and the vulcanizates showed a lower tensile strength. It was found that when the mixed compound had to be kept for some time, the sulphur and accelerator should be added at least 24 hours after mixing.

A series of experiments with different sulphenamide accelerators showed that there was only a slight reduction in scorch time when these were added to the internal mixer at a high temperature and the sulphur added on the mill. If the stocks were kept for any length of time, however, they showed a greater tendency to scorch, although the time for optimum cure became longer.

Accelerators of different types were then incorporated into a carcase compound at a high temperature and the products compared with the same compounds in which the accelerators had been added after the high temperature mixing: the sulphur was again added on the mill. MBT showed peptizing properties at high temperature, causing a retardation of cure: if added on the mill after high temperature mixing, the scorch tendency increased. No difference in properties was noticed, even when the stocks had been stored for 16 months before vulcanizing. The zinc salt of MBT showed no difference in behaviour if incorporated at a high temperature, and the mechanical properties were unaltered, even when the unvulcanized compounds had been stored for some time prior to vulcanization. MBTS was found to decompose in the internal mixer and hence the compounds were very scorchy. The physical properties of the vulcanizates were not, however, affected. Basic accelerators such as aldehyde-amines show no difference in scorch or in vulcanizate properties when mixed at high temperatures.

The thiuram sulphides showed a difference in behaviour according to whether the zinc oxide was present during the mixing or whether it was added on the mill at the end of the process. When TMT and zinc oxide were incorporated in a mixer at 150°C., no adverse effect on the scorch was noticed but the physical properties deteriorated. If added towards the end of the cycle, scorch occurred. When the zinc oxide was added on the mill after the heat treatment, no trouble was observed. As expected, TET showed greater processing safety than TMT. Dimethyldiphenylthiuram disulphide, however, did not behave so well, and at high temperatures gave scorching and reduced physical properties. TMT monosulphide gave scorchy compounds and poor vulcanizate properties when added together with zinc oxide to the internal mixer. When, however, the zinc oxide was added on the mill, the compounds had the same properties as when mixed at low temperatures.

When used as a sulphurless curing agent, TMT should be added on the mill, otherwise scorching and low physical properties will result, even when the zinc oxide is added later.

Carbon Black and Vulcanization

Evidence on the role of carbon black in the vulcanization reaction is given in a paper by Dogadkin, Skorodumova and Fel'dshtein,[2] which corroborates the findings of Blokh and Melamed, to which reference was made in the first article of this series (*RPW*, April 1, 504).

The later authors determined the amount of rubber which was adsorbed at room temperature by various carbon blacks from a solution of butadiene-styrene rubber in n-heptane, using the refractive index of the centrifuged solution as a method of estimation. It was shown that the amount of adsorbed rubber per unit surface area of black decreased as the proportion of oxygen-containing groups on the surface of the rubber increased. The same result was obtained when a mixture of rubber and black, prepared on cold rolls, was heated in a press for two hours at 143°C., and the composition of the gel determined by nitric acid oxidation.

The latter experiment was then made with 'sulphurized black', made by heating equal amounts of channel black and sulphur for six hours at 145°C. and extracting the free sulphur with acetone, a process which resulted in a black containing 0.7% sulphur. This sulphurized black was found to cause enhanced cross-linking on heating with rubber.

Attention was then given to the effect of an oxidized black on the kinetics of vulcanization. An HAF black was oxidized by heating at 400°C. for 1½ hours in air, resulting in a more acidic surface. This oxidized black slowed down the rate of vulcanization and imparted a reduced tensile strength to the vulcanizates. Similar effects were noticed when rubber - black - sulphur compounds were heated, but in this case it was observed that the highest combined sulphur was obtained with HAF black and the lowest with channel black, whilst lampblack occupied an intermediate position.

The authors concluded that the portions of the carbon black surface which are most active in combining with sulphur or rubber are those which are unoccupied by oxygen-containing groups. Thus the activity is increased by increased surface but decreased by increasing oxygen content.

New Synthetic Polyisoprene

The Russians have announced[3] a new synthetic polyisoprene rubber SKI-3 with a cis-content of 92 to 99%. This is compared with their previous SKI lithium-catalyzed rubber of cis-content 65%, with the various American polymers of cis-content from 94 to 97%, and with natural rubber (cis-content 98%).

The previous SKI rubber had no tack and did not calender smoothly; it was rapid curing, and yet had a low modulus and high elongation. The new SKI-3 has tack properties similar to those of natural rubber and gives smooth, glossy sheets when calendered. Its properties when vulcanized are very similar to natural

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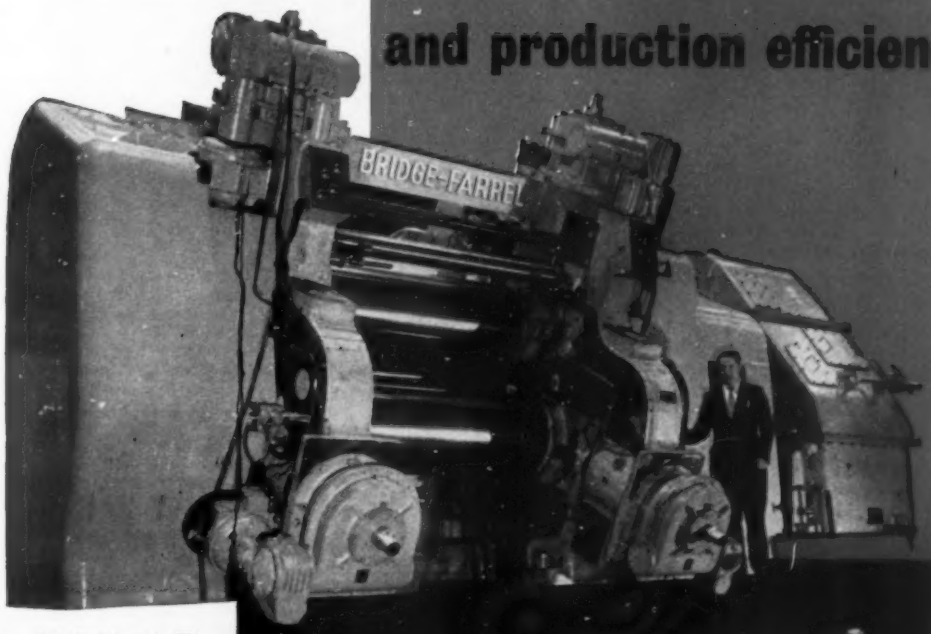

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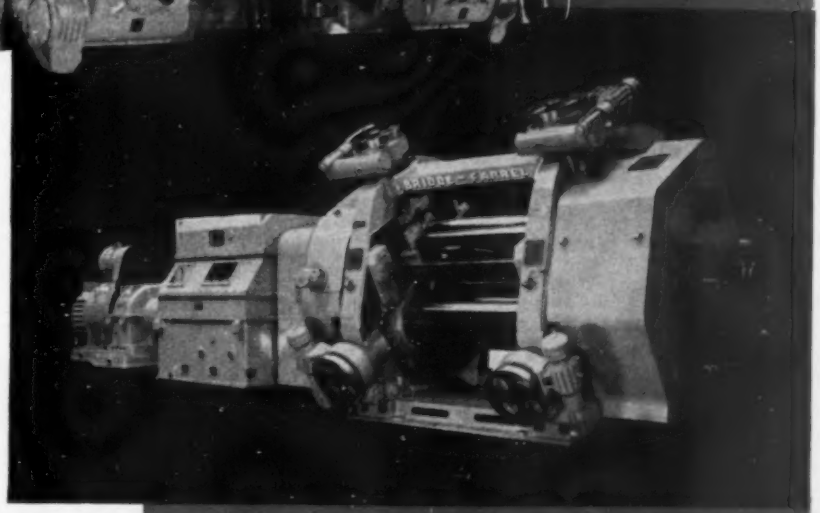

Bridge-Farrel 24" x 66" 3-Roll Triangular Calender. The illustration shows one of several recently built and in operation, and considered to be the fastest precision Rubber Calenders in the world.

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In Continuous technical association with the FARREL-BIRMINGHAM CO. INC., U.S.A. for over 40 years on the BANBURY MIXER and special machines

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Accelerators for Polychloroprene

A study of the effect of a number of organic compounds on the vulcanization of polychloroprene is described by Zakharov and Makarova.[4] They introduced one part by weight of each substance in turn to a compound consisting of polychloroprene 100; magnesium oxide 7; zinc oxide 5.

The greatest cross-link densities were obtained with pyrocatechol and with m-phenylene-diamine, but these gave speedy reduction in tensile strength as soon as the optimum cure had been reached. Ethanolamine and ethylene diamine on the other hand gave a high modulus with little reduction in tensile strength on prolonged cure. Most of the additives gave scorchy compounds, except ethanolamine and ethylene diamine, which reduced slightly the tendency to scorch.

Nitrile Rubbers for High Temperatures

The use of nitrile rubbers at temperatures up to 150°C. has been discussed by Novikov, Kaluzhenina, Gelinskaya and Kazakov.[5] They emphasized that the action of antioxidants at 150°C. might well be different from that at 120°C., and suggested methods of compounding nitrile rubbers for use at high temperatures.

The activity of various antioxidants was deduced from the length of the induction period of the oxidation reaction at 150°C. and by the changes in cross-linking produced in the later stages of the reaction. The following substances were examined, one part per hundred of rubber being added to the compound: mercaptobenzimidazole, diphenylolpropane, dinaphthyl - *p* - phenylenediamine, nitroso-β-naphthol, dimethylphenol-*p*-cresol, Rhodamine-S base, Fatty Red S, and a pyrazolone rubber dye.

Of the above compounds, dinaphthyl-*p*-phenylenediamine was found to give the longest induction period, but during oxidation of vulcanizates containing this compound, further cross-linking took place, whereas with dimethylphenyl-p-cresol and mercaptobenzimidazole, although the induction period was shorter, less additional cross-linking occurred during oxidation.

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It was found that the rate of liberation of hydrogen sulphide was identical whether the compounds were heated in nitrogen or in air. The quantity of hydrogen sulphide increased with the amount of sulphur in the compound and the temperature of vulcanization: the rate of liberation increased markedly above 170°C. when 'gassing' of the ebonite was liable to occur. At all temperatures, the rate of liberation of hydrogen sulphide was found to be highest in the early stages of vulcanization.

It was concluded that the formation of hydrogen sulphide was due to the destruction of sulphur cross-links with the formation of S_2 radicals and subsequent removal of α-methylenic hydrogen. The high initial rate of liberation was due to the destruction of labile polysulphide cross-links. The presence of TMT did not affect the rate of production of hydrogen sulphide, but DPG resulted in a slightly higher yield.

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REFERENCES

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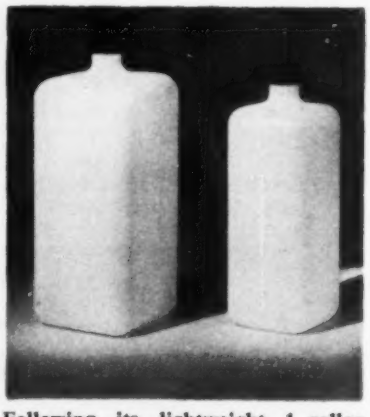

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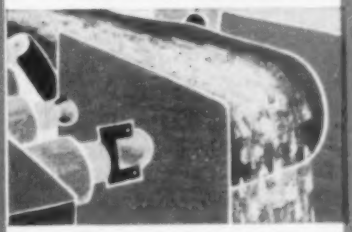

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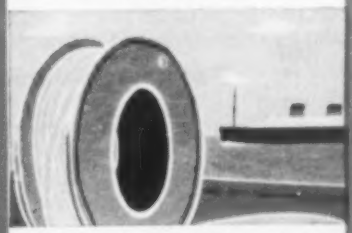

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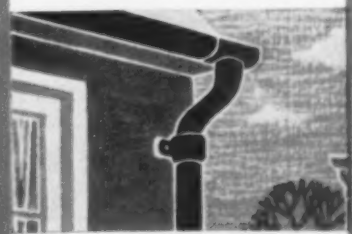

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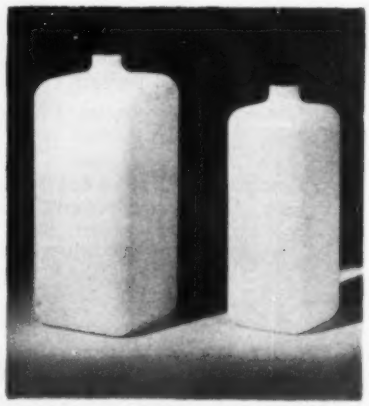

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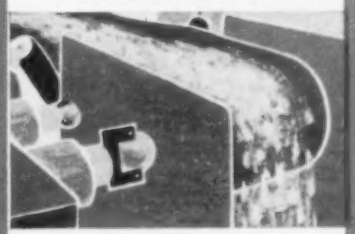

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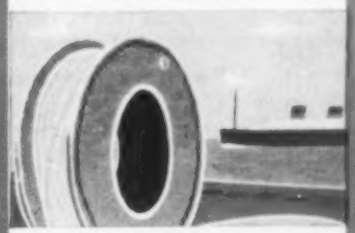

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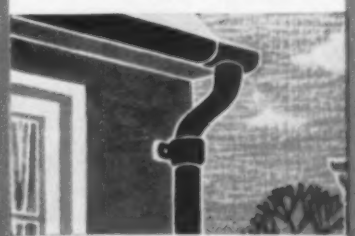

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VIEWS *and* REVIEWS

IT is to be expected that there are one or two papers which, although well worth reviewing, escape getting dealt with, for one reason or another, and are put on the 'waiting list'. This week I shall deal with some of them.

Faults in GRP

In the production development of new processes there often comes a stage when someone demands a written 'Beginner's Guide to Faults and Their Remedies'. That demand should be met. It sometimes is not, because of opposition from the technical staff.

I have met technologists who resisted the writing-down of such a body of knowledge, but, among the reasons they advanced in support of this attitude, I never found the one which I am sure chiefly motivated them. They feared that they themselves might be harmed in some way, perhaps by disclosing patches of ignorance which lay behind their knowledge.

The preparation of such a 'Faults Specification' has two main values: it releases skilled men, technical and production, for more important jobs, and it shows just where more knowledge is wanted.

In *Plaste und Kautschuk* for January 1961, Vol. 8, No. 1, pp. 48-50, there is set out in tabular form under the title 'Faults Arising in the Working of Plastics Reinforced with Glassfibre; their Causes and Remedies', a chart for the diagnosis and cure of some of the ills to which this process is prone. It looks good to me, although I have only a limited practical acquaintance with the subject. It is certainly practical, emphasizing the remedies rather than the theory of the causes.

Some of the faults dealt with are: bubbles, hair cracks, wrinkles, holes, delamination, odour, projecting fibres, spots and larger areas lacking resin or having too much resin, poor moulding, and loss of shape.

Polythene Packaging

I would like to draw the attention of those interested in polythene as a packaging material to three tables of the properties of polythene, in *L'Officiel des Matieres Plastiques* for December 1961, Vol. 7, No. 76, pp. 722-6.

Table I gives permeability factors for a wide range of liquids (water, acids, alkalis, ammonium chloride solution, hydrocarbons, alcohols, ethers, phenols, esters, aldehydes, ketones, amines) each at four temperatures. The factor is expressed in grams passed in 24 hours through a polythene film of thickness of 0.025mm. and an area of 100 sq. cm.

Table II gives the change in refractive index of various liquids stored at 21°C. in glass and in polythene bottles.

Table III gives the figures for changes in concentration of various liquids stored in glass and polythene bottles.

Altogether, 80 liquids were studied under 360 conditions of temperature, and in only 29 cases was polythene disadvantageous. These cases included: nitric acid, caustic soda, acetic acid, acetic anhydride, ethylene glycol, butyraldehyde, benzaldehyde, benzene, chlorotoluene, and sodium hypochlorite.

Rubberized Hair

Into the protection of articles against shock by the absorption and dissipation of impact energy, rubbers and plastics enter widely. One of the most technically interesting and commercially popular is the so-called rubberized hair, which is a mass of curled hairs elastically bonded at the points where the hairs touch or cross each other. It is an old industry evolving into a highly technical one under the impact of new demands.

Almost An Engineering Material

Formerly sold by density — and then quite a variable commodity — it is now almost an engineering material with an accompanying set of tables aimed at making its use precise and economical. Its energy-absorbing capacity is dependent on several factors, such as the kind of hair or other fibre, the orientation of the hair, the nature of the bonding medium. In recent years progress has been made in all these fields, as it has also in methods of manufacture of rubberized hair. Formerly a skilled, manual process, increasing mechanization has reduced costs and opened new possibilities of improved and controlled properties.

In these developments one of the leading firms has been the Hairlok Company, whose name is almost a synonym for the material itself. Its latest development is *Texlite* which appears to be made by a new process in which curled hair is first carded into a uniform layer of light density and random orientation and then gathered by a system of needles and condensed to the density required. This is claimed not only to preserve the original curliness of the hair but to impart also a crimp.

The new material is an improvement in that it makes possible a considerable reduction in density, and therefore the weight of the package, while this high performance is only slightly affected by repeated drops. The brochure issued by the makers contains a page of charts from which the most economical thickness, density, and area of *Texlite* can be derived when the safety factor of the article being packed (in terms of 'g'), its weight, and the height of drop to be protected against are known.

Process Tests

This calculated use of rubberized hair illustrates the advantages of scientific testing in basic physical units. Of course, there is nothing like an actual service test, but it has its limitations. One is that you want the result very much sooner than you get it, and when you have got it you often find it is too late to do anything about it. Another is that the results are not usually constructive, as are those of many derived tests, that is, the data cannot be used in further calculations for designing or for the controlling of processes.

Unfortunately, processing tests cannot always be reduced to such as give a quantitative measurement of simple, definite physical phenomena. Processing behaviour is frequently a complex mixture in an unknown proportion of several simpler properties. Consequently, there often grows up in a factory an *ad hoc* method of testing aimed at measuring this complex of properties as rapidly and repeatably as possible.

The results are rarely translatable into simpler terms or even comparable, one method with another; in fact, one factory's method of test may be quite unsuitable for another factory though ostensibly operating the same process.

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

Cepar Testing

It is with these considerations in mind that I mention the paper contributed by F. S. Conant and W. E. Claxton to *Rubber World* for November 1960, Vol. 143, No. 2, pp. 71-77, 83. It describes the CEPAR apparatus, a versatile instrument (though its versatility will be regarded in some quarters as a shortcoming) for measuring some of the processing characteristics of rubber mixes.

A sub-heading says: 'Elastic stiffness, orifice flow resistance, hot recovery, and extruder swell may all be measured in a rapid and continuous manner on this new apparatus and may be used to evaluate and control factory operations with many rubber stocks'. Its name, CEPAR, is derived from Cure, Extrusion Plasticity, and Recovery.

'The basic apparatus may be used to perform tests in two distinct categories, evaluation of curing and of processability characteristics of elastomers. . . . Only a separate insert in the test chamber is required to change from one type of test to the other'. The paper published here is limited to the use of this apparatus for measuring extrusion characteristics.

The small sample, weighing around 4gm. and being 0.5in. high and 0.75in. in diameter, closely fits the interior of a heating chamber and is confined therein by a disc with a central orifice. On to this disc a sudden, chosen load is applied causing 'an instantaneous deflection which is related to the elastic or time independent deformation properties of the material'. 'Continued load application results in a continuous extrusion at a nearly constant rate, the reciprocal of which is a measure of the flow resistance. . . .'

At this point in my reading, I thought: 'Not another plastimeter . . . !' but this apparatus is much more than a measure of plasticity, and I must leave the expert in this field to say whether these advantages outweigh the introduction of a new tester into an already overburdened control laboratory.

'Upon removal of the load the extruder portion of the material tends to retract through the orifice, thus forcing the disc upward and providing a measure of hot recovery'. It is also possible to measure the length of the extrudate when the sample has been removed at the end of the testing.

The changes in position of the disc, that is the extent of deflection, can be recorded on a strip chart, and the paper carries an illustration of such a chart, and describes the methods of calculating some of the parameters from it.

It will be clear that the apparatus can be used to measure scorch by correlating an inflection point on the curve with modulus data, and also to depict scorch behaviour by the shape of the scorch curve. The authors also claim that a composite CEPAR index has been found to vary with the variations observed in three important characteristics of polymer processing: 'knit time' which is the time required for the polymer to form a continuous band on the mill, 'smooth time', the time required on the mill for the band to become smooth and free from holes, and 'carbon black-in time', which is the time required for incorporating a given amount of carbon black.

The apparatus has been used to study a number of rubber mixing phenomena, those concerned with 'heat history' being of particular interest.

Ageing Tests

This issue of *Rubber World* for November 1960 carries some interesting and useful observations on the ageing of rubbers, especially on the relationships between laboratory and service ageing. It is reported on page 104 that Dr R. D. Stiehler of the National Bureau of Standards, in an address in Boston spoke of a study by the Bureau which 'showed that elongation was the only criterion of rubber ageing which could be compared with service conditions'.

The Chicago Rubber Group heard a talk by F. Wilcox of Witco Chemical Co., in which he also compared indoor with outdoor ageing. 'The ozone box test adopted by the rubber industry as a method of predicting the weather-ageing characteristics of rubber shows results that correlate well with those of outdoor exposure for neoprene and butyl polymers, but is not so useful for predicting ageing of natural rubber and SBR polymers'. He thought the difference might be caused by the difference in temperatures of the ozone box and roof tests in various parts of the country.

He compared the effects of three types of wax of different melting points in outdoor and indoor ageing. Discrepancies were found which were not easy to explain — though in fairness to Mr Wilcox it should be said that he made some good guesses.

For instance, a white sidewall cracked during flexing in the ozone box if it contained both antioxidant and wax, but it did not crack if it contained antioxidant only. Exactly the opposite was found when the two mixes were used in tyres in service in Los Angeles. 'It is presumed that the cracking occurred under static conditions when the tyre was not being flexed, and that only the wax was able to protect the rubber at that time', he said.

Human Durability

This is all very confusing and reminded me of some remarks written by an eminent medical man whose book I was consulting for information for the chapter on Retirement for my own Handbook for Executives. This was in the 'Pelican' book, *The Human Machine*, by Dr Adolphe Abrahams, Consulting Physician to the Westminster Hospital. Sir Adolphe distinguishes — as I have long advocated the polymer industry should do — between 'ageing' and 'durability'. He points out that everybody wishes to live a long time but that nobody wishes to grow old.

But whichever way it be regarded, the recipes for living long are various and sometimes mutually contradictive. There were, for instance, the Brighton centenarian twins, one of whom attributed his survival to general abstemiousness and lifelong abstinence from tobacco and alcohol, while his brother was equally certain of the beneficial effect of smoking and indulgence in as much good living as opportunities afforded. 'Both may have been right and both may have been wrong. It may well be that the machinery runs down in its own time irrespective of habits'.

While it is clear that 'the durability of the human machine is related essentially to the nervous system', it is not possible to say by what mechanism. Indeed, the finest recipe still appears to be — choose the right parents.

CHARLES JENNINGS

MEN and MATTERS

A Review of People and Events

by Peter Richards

WILL there be parades and kit inspections at Burtonwood Engineering in the near future?

The new post of works director has been filled by Brigadier C. J. Tobin, CBE, until recently director of work study at the War Office, under the Deputy Chief of the Imperial General Staff.

Brigadier Tobin will be responsible for all manufacturing activities at the Warrington factory, which is expanding rapidly.

In 1945/46 he ran virtually the whole economy of Burma as director of supply and industries on the Civil Affairs staff. During this time he recreated much of Burma's industry and established the basis for its post-war industrial recovery.

As you can see he is not a soldier who walks into industry with little knowledge of its problems. At his last appointment he was responsible for the application of work study in all aspects of army life. A Fellow of the Institute of Work Study and a Member of the British Institute of Management, he has lectured widely on work study and on his other interests in business management, particularly on materials handling.

Flying the Blue Peter

What is believed to be the first civilian flight into Andover RAF aerodrome took place recently when Blue Peter Retreads Ltd. chartered an aircraft to fly their Midland Distributors to Hampshire for a conference and tour of the 'Blue Peter' factory at Basingstoke.

The visit coincided with the launching of the company's new car retread — the Suretread — and great interest was shown in a new battery of push-button electrically-operated presses installed for this product.

Texus in Europe

Dr H. K. J. de Decker has been made export technical manager of Texas-US Chemical Co. Dr de Decker will live in Europe and will carry out direct technical assistance on Synpol synthetic rubber compounding and processing through all Texus agents (in the UK through Chas. Page and Co., 52 Grosvenor Gardens, S.W.1). Dr Decker, who has also been with the US Rubber Co., served for six years as research director of Rubber-Stichting, Delft, Netherlands, a rubber research institute financed by the co-operating natural rubber producers in Indonesia.

As director of the Dutch Rubber Research Institute, Dr de Decker headed a research group which developed a statistical design for measuring tyre tread wear; developed processes for preparing plastics from natural rubber latex, and for improving the uniformity, production costs and flame resistance of foam rubber.

G. G. Zahler, managing director of British Instron Ltd., manufacturers of testing equipment, which opened its first UK factory recently *(RPW April 29 636)*

First Baglan Appointment

British Hydrocarbon Chemicals Ltd. has appointed J. G. Hill works manager of its projected £10m. Baglan Bay petrochemical complex.

Mr Hill has been plant manager of Forth Chemicals Ltd. at Grangemouth since October 1951, during which time Forth has expanded its capacity from 10,000 to 50,000 tons a year.

Before joining Forth, Mr Hill was with Monsanto Chemicals Ltd., Ruabon, where he was maintenance manager for five years.

It is planned to bring the Baglan Bay works into operation about the last quarter of 1962.

H. D. I. Brown

H. D. I. Brown, FIRI (pictured), has had to retire from his position as managing director of Hubron Rubber Chemicals Ltd., due to ill-health, although he remains chairman of the company. J. H. Brown has been made managing director. R. F. Reynolds and J. Robinson have been made directors of Hubron Rubber Compounds Ltd.

Du Pont's Deputy MD

Samuel W. McCune, general sales manager of Du Pont Co. (UK) Ltd., has been promoted to deputy managing director.

An engineering graduate of Princeton University, Mr McCune joined

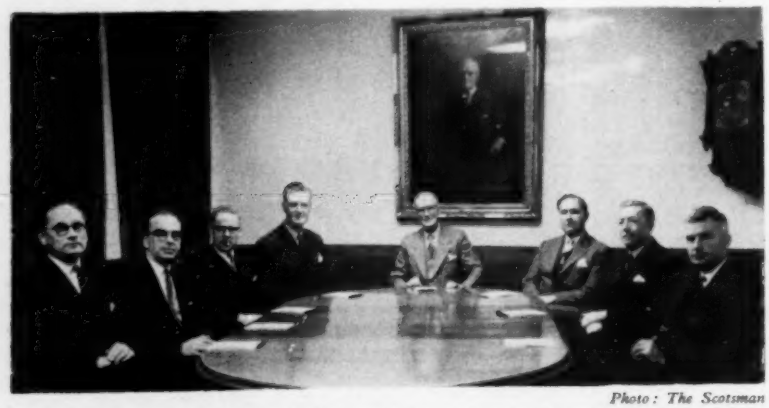
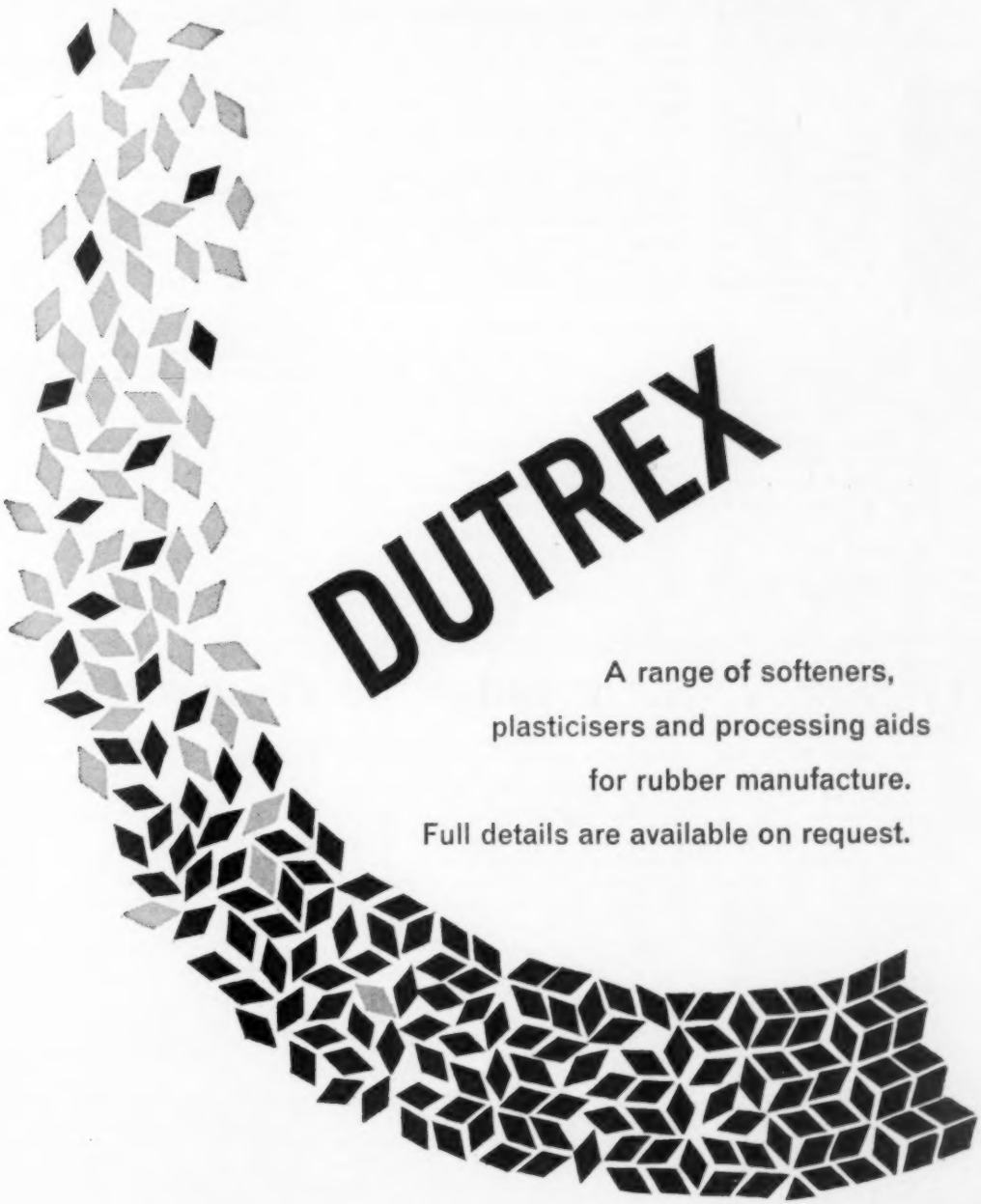


Photo: The Scotsman

Ten years ago George MacLellan and Co. Ltd., the Glasgow rubber manufacturers, embarked on a systematic programme of export development. Today exports to more than 47 countries account for 25% of total production. This recent photograph of the MacLellan board shows (*left to right*): D. M. Lean, development director; Eldon Sandys, financial comptroller; S. Young, sales director; Robin MacLellan, joint managing director; Kenneth MacLellan, chairman; Basil MacLellan, joint managing director; David Todd, technical sales director; John MacLellan, buying director. George A. MacLellan was unable to be present



DUTREX

A range of softeners,
plasticisers and processing aids
for rubber manufacture.
Full details are available on request.

Shell Chemicals

SHELL CHEMICAL COMPANY LIMITED

Regional Offices

LONDON	Villiers House, 41-47 Strand, London, W.C.2. *Tel: TRAfalgar 1277.*
BIRMINGHAM	Gloucester House, 65 Smallbrook, Ringway, Birmingham 5. *Tel: Midland 8811.*
MANCHESTER	144-146 Deansgate, Manchester 3. *Tel: Deansgate 2411.*
GLASGOW	Royal London House, 48-54 West Nile Street, Glasgow, C.1. *Tel: City 3391.*
BELFAST	16-20 Rosemary Street, Belfast, Northern Ireland. *Tel: Belfast 26094.*
DUBLIN	33-34 Westmoreland Street, Dublin, Republic of Ireland. *Tel: Dublin 72114.*

SHELL and DUTREX are registered trade marks.

E. I. du Pont de Nemours and Co. in 1940. In 1957 he was transferred to Du Pont (UK). He is a member of the American Chemical Society.

D. E. Gatfield has been appointed sales manager of Vinatex Ltd. He is a graduate of London University and has been with the company for four years

Ciba Appointment

Sir Arthur Vere Harvey, CBE, MP, has been appointed to the Board of Ciba Ltd, Basle. This is the first time that an executive of the Ciba group of companies in the UK has been made a director of the parent company. It can be considered as an indication of the importance attached by the Swiss board to the role of the UK companies in this international chemical group.

Sir Arthur joined Ciba in 1957 as chairman of its four British subsidiary companies. A few weeks ago he was appointed managing director of the newly-formed Ciba UK Ltd., which is acting as the holding company for all Ciba interests in this country.

bICP in CCCP

Several members of the International Synthetic Rubber Co. at Hythe are busy learning to speak Russian.

They are preparing to serve on the company's stand at the British Trade Fair in Moscow, which opens on May 19.

Two people on the stand are fluent Russian speakers, but in order not to be at a loss for words, the other ten members of the staff making the trip are learning the language with joint study lessons at the plant after working hours.

Something approaching 10cwt. of literature has been prepared in Russian for distribution at the Fair, taking the story of ISR into Russia, or as the staff would say now perhaps: bICP into CCCP.

Appointments in Brief

H. H. Townsend, a director of Greengate and Irwell, has resigned from the board and the company for reasons of ill-health.

Mr Townsend has been with the company since 1931, and was elected to the board in 1943. For several years he was the chairman of the Rubber Cable Manufacturers' Association, and has been until recently vice-chairman of the Rubber and Plastic Footwear Manufacturers' Association.

* * *

H. K. Hartley has been appointed general sales manager of Fawcett Preston and Co., a member of the Metal Industries Group.

Mr Hartley, who has been with Fawcett Preston since 1940, was appointed sales manager of the rubber and plastics division in April 1960.

* * *

C. F. Bonnet has been appointed managing director in Europe by Cyanamid International. He will be responsible for sales development and for liaison between Cyanamid subsidiaries producing general chemicals.

* * *

Kenneth Long has been appointed press officer for Bakelite Ltd.

Mr Long, who is 28, has been editor of *Sports Cars Illustrated*, and, for the past two years, associated with technical books production at George Newnes Ltd.

Polly Ester Says...

'Take-off equipment — mechanical aids for strip club'

THE LEGAL ANGLE

Judge for Yourself?

By a Barrister

A reader writes: 'In RPW February 25 1961, the Barrister states that a servant may be "legally" dismissed summarily for committing any one of a number of offences, including stealing. Would it not be necessary for the employer first to establish "legally" — i.e. through the medium of the Courts — that the servant was in fact guilty of the stated offence, or does "Barrister" categorically assert that the employer can be both complainant and judge at the same time?'

A fair question; but one which starts from the wrong end.

Master and servant relationships are governed by contract. One of the implied terms of that contract is that the servant will do his work in a proper and workmanlike manner, and will not indulge in illegal activities in or about his master's business. If he does so, he can be dismissed summarily: he will have broken his contract in a material way. But if he is dismissed summarily when he has not committed a serious breach, then he will be in the right.

Practical World

In the practical world of business, you cannot wait for a court to decide who is right or wrong before acting. If there is doubt, most employers give the employee the benefit of it — and pay him his wages or salary in lieu of notice. But if you have no doubt that your man has been stealing — or, for that matter, revealing your secrets to competitors, smashing your machinery, creating serious incidents amongst your staff, or otherwise acting in clear breach of his contract of service — you will doubtless dismiss without delay.

Judging the Judgment

It is at this stage that the law may be brought into action. If the man considers that he has been wrongfully dismissed, that you had no lawful justification for the summary sack, then he can sue you. He can ask the court to adjudicate as between him and yourself, to decide whether he had broken his contract in such a way as to allow you to dismiss him, or you had broken the contract by dismissing him.

In other words, you must use your own judgment in the first instance; but if you make a mistake, it can be a very expensive one, because the ex-employee will be the complainant, the Judge will make the decision — and you will be the defendant.

In that event, whether or not the judgment goes in your favour will depend upon whether or not your judgment in the first instance, was correctly exercised.

Plantation Newsletter

SQUEEZE? NONSENSE, SAYS SINGAPORE MARKET

by our Malayan Correspondent

FROM KUALA LUMPUR

MALAYA'S Head of State, His Majesty, the Yang di-Pertuan Agong, in his royal address to both Houses of Parliament here on the occasion of the opening of the third session of Parliament, said it was hoped that a Rubber Exchange in Kuala Lumpur would be opened before the end of this year.

He said that in order to ensure that there was international confidence in the stability of Malaya's rubber market, a Rubber Exchange would be organized and established on sound lines acceptable to international trading circles, and steps were being taken to prepare the necessary legislation and constitution so that it could come into being, if possible, before the end of the year.

Repayment from Cess

A total of 2,300 rubber estates in Malaya are now receiving the second instalment of repayment from the $55m. which has been accumulated in the rubber anti-inflationary cess fund.

The amount due to be repaid to the estates is $33m., and the quarterly instalments they are now receiving total $8¼m.

To smallholders goes $22m., and this has already been transferred from the anti-inflationary cess fund to the Rubber Industry (Replanting) Board for the credit of smallholders.

The whole amount of $55m. was collected by the Malayan Government when the price of rubber went above $1 a lb. mark from August 6 1959 to October 5 last year.

In accordance with the Rubber Anti-Inflationary Cess Ordinance, the repayments, insofar as estates are concerned, should be made in four equal instalments at the end of each quarter. The $33m. due to estates will be paid out by the end of this year.

The Government is now in the process of paying out $8¼m., representing the second instalment, through individual cheques to estates.

IRSG Meeting

Lew Sip Hon, the controller of the export division of Malaya's Ministry of Commerce and Industry, will preside at the forthcoming meeting of the management committee of the International Rubber Study Group to be held in London from May 15 to 18.

Malaya was elected chairman for this London meeting at the 15th plenary session of the Study Group in Kuala Lumpur last September. This will be the 68th meeting of the management committee of the IRSG.

There will be three other Malayan representatives at the meeting. One will be Mr Yeo Beng Poh, the second secretary (trade) of the Malayan High Commission in London; another, a rubber trade adviser from Kuala Lumpur; and the third, a scientific adviser from London's Natural Rubber Producers Research Association.

Mr Lew said the London meeting would discuss several matters which have an important bearing on Malaya's position as the world's principal supplier of natural rubber.

The agenda also includes discussions on methods of reducing fluctuations in the price of natural rubber. It will also review the supply and demand aspects of natural rubber over the period up to 1965.

Meanwhile, the Singapore rubber market has dismissed as 'nonsense' a report in the *London Financial Times* which conveyed the impression that local dealers were creating a 'squeeze' and forcing up the price of rubber.

The chairman of the Singapore Chamber of Commerce Rubber Association, E. G. Holiday, said there was remarkably little speculation on the Singapore rubber market at present and all rubber produced was being absorbed overseas.

According to experts here the recent rise which had taken rubber over the 92 cents level in Singapore had been due to buying in London and New York, some of it speculative in view of the international situation. Buyers had also bought rubber as a safeguard against possible currency devaluation, it was learned.

Mr Holiday said the bullish sentiment in this market had been touched off by the March shipment figures which, at 108,330 tons, were 29% better and were, in fact, the highest since November 1959.

Rubber Statistics

MALAYA — WEST GERMANY — CANADA

MARCH rubber shipments of sheet and crepe from Malaya totalled 98,173 tons, according to the chief statistician in Singapore.

The total comprised: UK 18,520, USA 9,662, West Germany 8,565, Japan 9,381, Russia 5,630, Europe 29,899, Commonwealth countries 8,330, other countries 8,186. China took no rubber during the month.

Latex and revertex shipments were 10,157 tons comprising: UK 2,308, USA 1,128, West Germany 1,031, Japan 1,444, Europe 3,222, Commonwealth countries 554, and other countries 470.

Shipments in February were 77,196 (sheet and crepe) and 6,480 (latex) respectively.

West Germany

Imports of natural rubber and rubber sole crepe during 1960 totalled 139,352 tons, including 80,282 tons from Malaya, 11,811 tons from Thailand, 11,661 tons from Nigeria, 9,947 tons from South Vietnam, 8,638 tons from Indonesia and 7,303 tons from Ceylon. Imports of synthetic rubber during 1960 amounted to 49,962 tons, including 33,951 tons from the US, 7,536 tons from Canada, 3,275 tons from Italy and 2,486 tons from France.

Production of tyres in the first two months of 1961 totalled 37,806 tons, over 2,000 tons more than the same period in 1960. Output of other rubber goods in the same period was 52,450 tons, compared with 44,932 tons last year.

Canada

Canadian consumption of rubber, both natural and synthetic, declined in January 1961 by 16% to 8,094 long tons from 9,630 tons in the same month last year. Production of synthetic rubber in January amounted to 13,781 long tons, compared to 12,596 tons a year ago, while production of reclaimed rubber amounted to 527 long tons, against 436. Consumption of natural rubber in January this year amounted to 2,434 tons compared to 3,341 a year ago, that of synthetic rubber 4,438 tons, compared to 4,797, and of reclaimed 1,222 against 1,492.

This golf-club carrier, so light it can easily be carried with one hand even when fully loaded, is arousing much interest on American courses. Both base plate and ball and tee wing plate are injection moulded from Cycolac ABS resin manufactured by the Marbon Chemical Division of Borg-Warner, whose UK agents are Anchor Chemical

Plantation Share Survey

The Price Rises

BUT LITTLE CHANGE IN STATISTICAL BACKGROUND

RUBBER dealers along Mincing Lane have been puzzled recently by the sudden upward turn the price has taken. No one seems to know exactly why it has happened. Reports from Malaya, where dealers are known to have been holding reasonably large stocks, tell of heavy outward shipments last month. However, nobody is too sure whether the rubber has, in fact, gone to consumers, or whether it is merely being stockpiled elsewhere. The present 'quote' of around 2s. 3d. a lb. is still well below that of a year ago, when it reached 3s. 6d. But then the sudden release of large stocks from Singapore sent it tumbling.

Whatever this brightening atmosphere is due to, however, there has been very little change in the statistical background for the commodity. New rubber consumption in the United States in January and February deteriorated from a total of 280,700 tons to 229,900 tons, of which natural accounted for 66,000 tons against 92,400 tons. Moreover, world consumption of natural rubber in 1960 exceeded production by no more than 12,500 tons after promising a much better showing.

According to the provisional figures, December production of 205,000 tons exceeded usage by as much as 55,000 tons. But, as we know, monthly returns in this field can be most unreliable and there is some doubt whether the real production surplus was anywhere near as heavy as the bare figures would suggest. It is anticipated that the next few months will produce a better showing. In this connexion, it is worth noting that pan-Malayan production in March was cut back to 50,000 tons, compared with 55,000 tons in the same month of 1960.

Local stocks were down to about 125,000 tons against over 145,000 tons in the previous month. During the past year the supply position was put out of gear by the delivery of 151,000 tons from the American and British stockpiles. On the basis of prevailing price levels, releases from this source will be considerably lower in the coming year. In fact, only a mere 6,100 tons have been sold in the first three months.

No sales of the British stock are made below the level of 2s. 1¼d., and, between that price and 2s. 3d., monthly disposals are limited to 800 tons. The American Government plans to sell 470,000 tons over a period of nine years. Of this 102,895 tons have so far been disposed of.

Merger Agreement

The board of MALAKOFF RUBBER and BROOME RUBBER PLANTATIONS has reached agreement in principle for a merger of the two companies. With this object, Malakoff is to offer to acquire the issued capital of Broome on the basis of four 2s. shares plus a cash payment of 1s. 3d. for every five 2s. stock units of Broome. On the basis of current price of 6s. 4½d. cum dividend for Malakoff, these terms give Broome Rubber a value of about 4s. 9d. compared with an earlier quotation of around 4s. 3d. The offer is sufficiently attractive to assure a substantial response, particularly in view of the resulting advantages in the matter of marketability.

Before the merger takes effect, Malakoff is to pay a final dividend of 37½%, bringing the total distribution for 1960 to 56¼%, against 50% for the previous year, and Broome an interim of 6¼% on account of the year to June 30. On a combined basis, the group will have an issued capital of £568,000, and will control some 14,600 acres of rubber in Province Wellesley, Selangor, Kedah and Kelantan, capitalized at under £40 per acre. Net current assets would be in excess of £200,000.

Nervous Selling

Some nervous selling of rubber shares has been sparked off by the Laos situation, but generally holders in this field appear to be content to await the coming reports for 1960 operations. The Malacca Rubber figures are in keeping with those so far published by other leading Malayan producers, profits having increased moderately from £550,000 to £572,000 after replanting provision. The maintained dividend of 40% is covered by a satisfactory margin, as shown by an allocation of £85,000 to general reserve and an addition of £16,000 to the balance carried forward.

Last year's rubber output totalled 12.7m. lb. (against 12.5m. lb.) and the accounts disclosed a working capital balance of £520,000 as well as trade investments costing £109,900. These consisted of 66,666 OIL PALMS OF MALAYA £1 units and interests in LEDANG BAHRU AND GUTHRIE LATEX, and the gross dividend income of over £53,000 clearly pointed to a considerable balance sheet undervaluation.

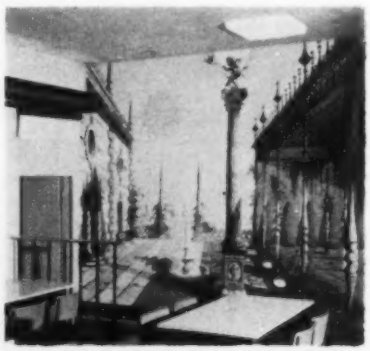
Although 162 acres of old rubber were cut out last year, JITRA RUBBER PLANTATIONS' output was up by 40,000lb., reflecting increasing yields from the young rubber. It is also notable that the overall increase in costs was confined to 2d. a lb. This was a shade lower than the rise in export duty and cess which the crop had to bear, and the overall result was an advance of more than 40% in pre-tax profits. With a proportionately lower tax charge, the dividend of 20% on the capital as doubled by the May 1960 scrip issue is covered with a reasonable margin, and once again an extra £5,000 is taken to replanting reserve.

Net expenditure on replanting was £11,878, so that the reserve has on balance been reduced by a little over £4,000. The present figure is £25,186, which is approximately £10 an acre and should prove adequate for foreseeable needs. The liquid position is also strong; the working capital balance being £39,200, plus unquoted trade investments of £18,232. This represents approximately 250 acres of rubber. No replanting is to be done this year, so that the increase in the crop should be steeper. The board's estimate is 1.31m. lb. of which 565,800lb. had been obtained in the first five months' working.

The chairman, W. A. Aitken, warns shareholders that profits will almost certainly be down this year, but he also makes the point that wages and export duties are geared to the price of the commodity so that costs should be sharply lower. The final result should again be satisfactory, and the 2s. units are by no means expensive at 3s. 3d., bearing in mind the strongly rising trend of output.

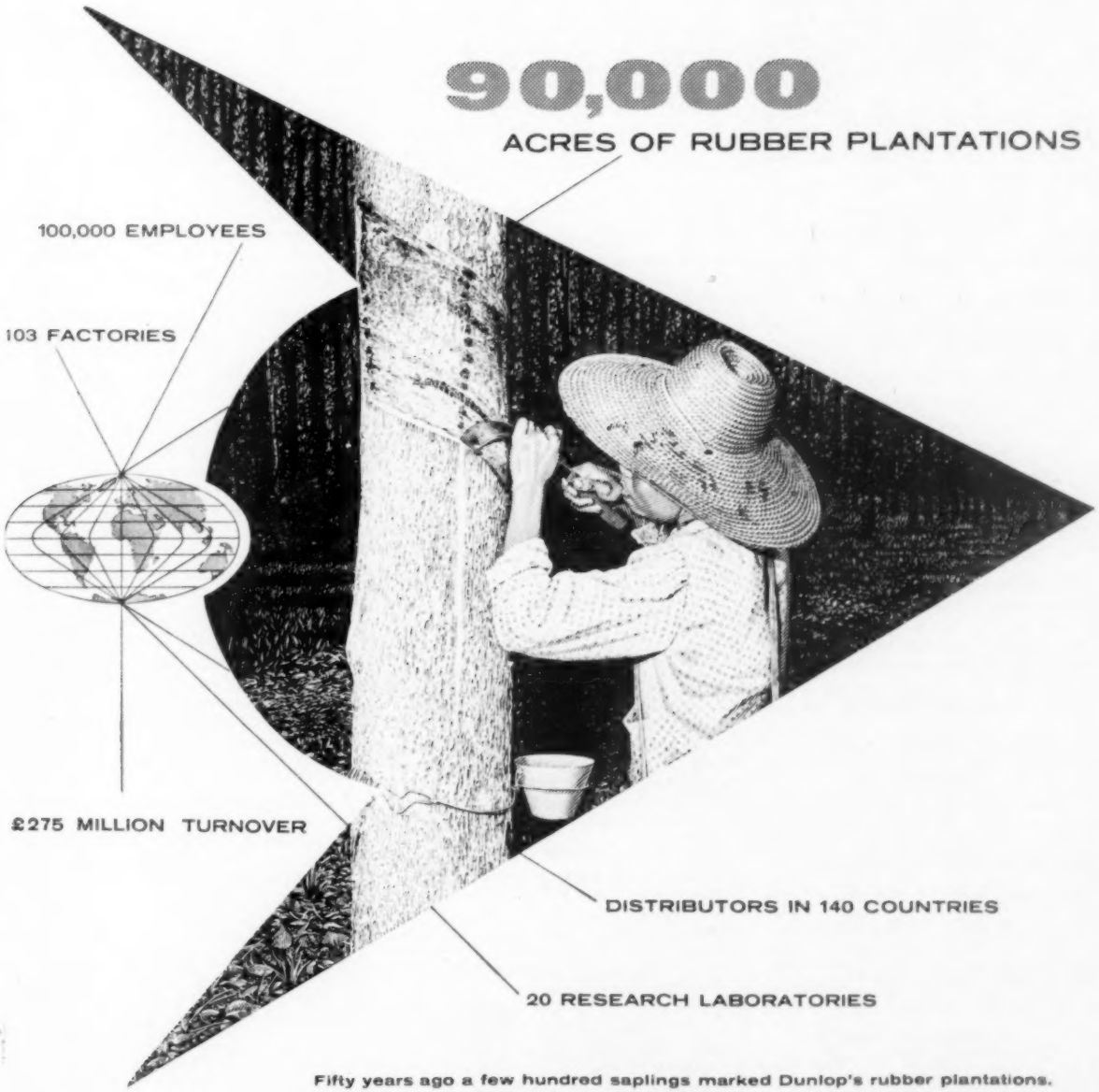
Impressive Position

An impressive position is revealed in the annual report of SUNGEI KRIAN RUBBER. Apart from Malayan estates with 4,748 acres planted under rubber, this Barlow company holds investments in other Malayan rubber producers with a market value of £150,000 and in Indian and Ceylon tea and African and Australian produce undertakings, with a market value of almost £130,000. These interests alone are worth the equivalent of 24s. per share, while in addition allowing for holdings of Government securities, the company has net current assets of £40,000. Dividend and interest income in 1960 amounted to over £67,000, exceeding the trading surplus of £63,700 earned from the rubber estates.



One of two Warerite pictorials, incorporated in laminated plastics, that decorate the entrance of two canteens in Bracken House, London, the recently opened headquarters of the *Financial Times*

BEHIND THE DUNLOP SYMBOL



Fifty years ago a few hundred saplings marked Dunlop's rubber plantations. Today these plantations are among the largest in the British Commonwealth. But successful rubber growing needs more than bigness. Increased productivity is as eagerly sought by the plantation supervisor as by the factory foreman. With his own experience and the help of scientific methods he has reaped a harvest.

Not so long ago a yield of 400 lbs. of rubber from an acre was considered satisfactory. Now, yields of up to 2,000 lbs. an acre are not unknown. An example of the creative effort of which the new Dunlop symbol is the hall-mark.

DUNLOP SYMBOL OF PROGRESS

Rubber Markets

LONDON

Reflecting steadiness at Singapore, values recovered a small decline and tended a little higher, mainly on Continental speculative interest. Sellers were cautious in offering. The market overall was quiet, with dullness accentuated by the May Day holiday in most European countries. United Kingdom factory demand was largely routine. Easiness ensued on improved prospects of peace in Laos.

Latest prices are as follows:

No. 1 RSS Spot: 26⅜d.-27d.

Settlement House:

June 26⅞d.-27.

July/September 26⅞d.-27d.

October/December 26⅞d.-27d.

January/March (1962) 26⅞d.-27d.

April/June 26⅜d.-26⅞d.

No. 1 RSS cif basis ports:

May 26½d.-26⅝d.

June 26½d.-26⅝d.

July 26½d.-26⅝d.

Godown:

May 90¼ Straits cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, May, 15s., cif European ports. Spot, seller, 15s. Bulk, seller, d.w. 15s. 2d. Creamed, seller, 14s. 9d. nominal. Normal, seller, May, 12s. 3d.

NEW YORK

The New York rubber market ruled as under on May 1:

DEALERS' PRICES

	US cents per lb., ex-dock	
	May 1	Previous
No. 1 RSS, May ..	32⅜b–32⅝a	32¼a
June ..	32¼a	32a
No. 2 RSS, May ..	32¼b–32⅜a	32¼a
June ..	32⅜a	31⅞a
No. 3 RSS, May ..	32¼b–32¼a	32a
June ..	32¼a	31⅞a
No. 1 RSS, Spot ..	32⅜n	32⅛n
No. 3 amber blanket crepe, May ..	25⅛n	26⅛n

FUTURES—REX CONTRACT

	May 1	Prev. Close
May ..	32.80b–33.25a	32.35b–32.60a
July ..	32.71t	32.15b–32.25a
Sept. ..	32.35b–32.50a	31.85b–31.95a
Nov. ..	32.25t	31.78t
Jan. ..	31.95b–32.10a	31.59t

Sales: 113. Tendency: Firm.

Futures were firmer on May 1 in a few positions, up nearly half a cent per lb. on commission house buying. Some traders said the situation in Laos and press reports that the Kennedy Administration was nearing a decision on sending troops into that country induced the buying. Dealings were fair. Physical rubber was quiet and the undertone firm. In late dealings futures held their gain of about half a cent firmly.

SINGAPORE

The market ruled very quiet throughout the morning of May 2 and little business was passing. Fluctuations were small. Lower sheets and offgrades were neglected. In the afternoon the market was very slow to start. After an initial slight easiness prices were unchanged throughout and the turnover limited.

	Malayan cents per lb., fob Malayan ports to open ports	
	May 2	Prev. Close
No. 1 RSS, May ..	92½–92¾	91½–91¾
June ..	92⅞–93½	91⅞–92
No. 2 RSS, May ..	92 –92½	90¾–91⅛
No. 3 RSS, May ..	91⅛–91⅜	90⅛–90½
No. 4 RSS, May ..	87⅛–88½	86½–87½
No. 5 RSS, May ..	79 –80	78 –79
No. 1 RSS, Spot ..	91⅞–92⅜	90¾–91⅛
No. 3 blanket thick remilled crepe, May	73½–74½	72½–73¾
No. 1 fine pale crepe, May	97½–98	96½–97¼
2X thin brown crepe, May	70¾–71¼	69½–70¼

Tendency: Idle.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums, fob at 176.00d. per gallon.

AMSTERDAM

The Amsterdam rubber market ruled as under on May 2.

	Guilders per kilo	
No. 1 RMA	May 2	Previous
May	2.45	2.44
June	2.45	2.44
April/June ..	2.45	2.44
July	2.57	2.56
August	2.57	2.56
September ..	2.57	2.56

Sales: Nil. Tendency: Quiet.

DJAKARTA

There were no sales on May 2. Prices quoted were 36.50 rupiahs per kilo buyers and 38.00 sellers. The market closed very quiet, reflecting dull overseas advices.

	Rupiahs per kilo	
	May 2	Previous
Spot No. 1 Priok ..	36.50b	36.50b
Spot No. 2 Priok ..	35.50b	35.50b
Spot No. 3 Priok ..	34.00b	34.00b
No. 1 fine pale crepe, spot	31.00b	31.00b

Tendency: Very quiet.

BANGKOK

The price of No. 1 RSS at Bangkok on May 2 was 29.0 (29.0) US cents per lb.

CEYLON

The price of No. 1 RSS at Colombo on May 2 was 114½ (112½) Ceylon cents per lb.

COMPANIES in the NEWS

Triplex Foundries Group

Triplex Foundries Group has announced that a contract has been entered into for the acquisition of the issued capital of Phipps Plastic Products and its subsidiary Gibson, both of West Bromwich. Phipps Plastic is engaged in the manufacture from Perspex, Cobex, rigid pvc, and cellulose acetate, of a large range of sheet fabrications, shapings and vacuum forming for all trades.

Musical and Plastic Industries

One of the reasons for the big drop in profits reported by Musical and Plastic Industries for 1960, was that the plastics division did not improve as much as the directors had hoped, with the result that the factory was not fully employed, says Mr B. Davis, chairman.

On the whole, Mr Davis was not pessimistic about prospects. The directors will concentrate on musical instruments, the main business, and make every effort to increase the plastics side. He felt sure that, once the present difficulties were surmounted, he would be able to present 'a better picture'.

Group profit, before tax, for 1960, was £80,396 (£180,068) and the dividend is cut from 32½% to 20%.

Year-end net current assets totalled £282,867 (£310,679), with overdrafts standing at £107,422 (£80,078).

Sungei Krian Rubber Estate

At 50s. 7½d. the £1 units of The Sungei Krian Rubber Estate yield 8.4%. This calculation is on the basis of a 20% dividend recommended for the year 1960 and 3.3 times covered by the earnings of that year. The yield is one of the lowest in the rubber lists where returns go up to 20%, but for this distinction there are good reasons. First a wider spread of assets, then the good yield per acre of rubber coming from the company's own estates, but, most important of all, the company has replanted much of its estates with high-yielding clones.

The crop estimate for 1961 is over 2m. lb., which is an increase of nearly 150,000lb. over last year. The 1960 profit, before tax, was £131,446 (£103,719).

F. W. Berk and Co.

According to C. H. Tanner, chairman of F. W. Berk and Co., chemical manufacturers and merchants, sales and profits for 1960 reached all-time records. Group sales of £9,024,200 were 8% higher than the previous year, and profits at £334,893, after £349,894 for tax, show an increase of 26%. The dividend is 8¼d. per 5s. share on increased capital, against the forecast of a maintained total of 7½d.

Mr Tanner said that in 1960, fixed assets rose from £1,461,073 to £2,196,971, and commitments totalled £210,000 (£27,000). Net current assets amounted to £2,001,628 (£1,575,966).

Industry INTELLIGENCE

Technical Data

Monastral Fast Green 3YS

The restricted shade range of the phthalocyanine class of pigments is considerably extended by I.C.I. Dyestuffs Division's latest pigment — Monastral Fast Green 3YS, a new homogeneous yellow-shade phthalocyanine green that is said to be yellower than any other phthalocyanine green at present available.

In the plastics field, the pigment will be found of value for colouring pvc, polystyrene and polythene, showing good fastness to heat and light. Its insolubility in plasticizers and in the polymers themselves prevents undesirable migration and blooming effects.

Polysar Krylene

Two data sheets have been issued by Polymer Corporation Ltd., and may be obtained from Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4. No. 11:2B deals with Polysar Krylene 602 moulded-on translucent soling, the completed product is claimed to have an attractive translucency and excellent flex life and abrasion resistance.

Technical Report No. 11:2C gives information on Polysar Kryflex 202 and Polysar S-630 in flame-resistant belting. The report describes friction, skim and cover stocks for flame-resistant belting based on Polysar butadiene-styrene rubbers.

Tracing Equipment

The Addison Electric Co. Ltd., London, has redesigned its induction tracing equipment. It has been transistorized to render it lighter, smaller, and more reliable. An indicating meter as well as a miniature loudspeaker have been incorporated in the small receiver. The company claims that this equipment enables cable paths, faults, depths, and pipeline routes to be traced rapidly, reliably and accurately. It is powered by two standard flash-light cells, and is supplied complete with an Inductive Probe and a set of electromagnetic headphones.

Azelaic Acids

Two recent publications of Prices (Bromborough) Ltd. deal with Emerox 1110 azelaic acid and with Emolein 2957 and Emolein 2958 lubricant esters.

Emerox 1110 is a nine carbon, saturated aliphatic dibasic acid. It presents an opportunity for new product development and product improvement in applications where dibasic acids are now important chemical intermediates. These fields include low temperature and polymeric plasticizers, unsaturated polyester resins, polyamides and synthetic lubricants.

The Emolein series of lubricant base fluids will be produced by Unilever-Emery after completion of factory construction at Gouda, Holland. It has been found that azelate esters for synthetic lubricant applications are successful because of good viscosity, stable low-temperature viscosities, satisfactory lubricity, high flash and fire values, and are stable to oxidation and thermal conditions.

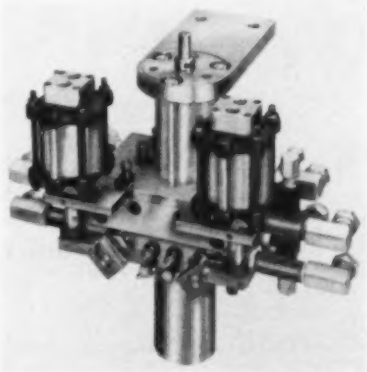
Machines, Materials and Equipment

Thickness Gauge

Addison Electric Co. Ltd., London, has introduced a new instrument known as the non-contacting wire diameter gauge (Type 680), which has been designed to meet the need for an accurate instrument capable of continuous non-contacting measurement of wire diameter during production. It consists of an indicator unit and a gauge-head, and these are connected by means of a co-axial cable. The instrument is claimed to have high accuracy, being independent of vibration, speed, temperature, and metal of wire, and to be suitable for recording warning signals and automatic control. Where the conductor size is known, the gauge can be used for the contactless monitoring, and automatic control, of the wall thickness of insulating coatings, such as polythene, pvc, rubber, and enamel, applied to metal cores.

Foam Mixing Heads

The Martin Sweets Co. Inc., 114 South First Street, Louisville 2, Kentucky, claims to be able to meter into the mixing chamber for on-off operation, up to six separate foam material streams. This development makes possible the pouring of large foam masses on shot-type, production installations. With correct handling this mixing head will supply accurately proportioned and correctly mixed foam for the whole pour. This is accomplished by means of the fast-acting valves, the interchangeable metering part design, and the self-cleaning, straight-side mixing impeller. Many formulations can be mixed at rates in excess of 150lb. per min. for moulding, pouring-in-place, or slab production of rigid and flexible polyurethane foams.



Publications

Booklets from Sweden

Two booklets have been issued by Stockholms Superfosfat Fabriks AB, giving details of its chemical products and the structure of the Fosfatbolaget Group, of which it is part.

The twenty-page booklet on the products lists several grades of pvc, moulding compounds, and urea and varnish resins, giving information on each grade. The guide book, illustrated by many photographs, gives a history of Fosfatbolaget and explains its research, work and development.

Further information can be obtained from Guest Industrials Ltd., 81 Gracechurch Street, E.C.3.

Araldite in Archaeology

The work of assembling broken and fragile articles is a major one for museum authorities everywhere, and in recent endeavours archaeologists have been greatly assisted by the use of modern synthetic resin adhesives, such as Araldite.

To explain the use of Araldite as an aid to archaeology, Ciba (ARL) Ltd. has published Technical Notes 218, which, with the help of photographs and tables, gives a concise account of its function. An example given is the Kentmere boat, which was discovered in 1955 and is nearly 600 years old. Now it is preserved with Araldite in the National Maritime Museum.

Copies of the booklet and further information can be obtained from the Technical Service Department, Ciba (ARL) Ltd., Duxford, Cambridge.

High Speed Impeller Mill

In a booklet issued by British Titan Products Co. Ltd., 10 Stratton Street, W.1, reference No. BTP/88, the performance of tioxide pigments in high speed impeller mills is discussed. These mills have recently had increasing application as there have been improvements in the dispersibility of many pigments. Nevertheless, formulation for high-speed impeller dispersion and practical techniques of manipulation remain speculative, due partly to some lack of appreciation of the fundamentals involved in dispersing by this technique. These fundamentals are given in the publication in concise form.

Synthetic Rubber Prices

Prices of synthetic rubbers appear regularly in RUBBER AND PLASTICS WEEKLY *in the first week of each month. It will be appreciated if suppliers will give notification of any price changes or additions to their range. C/f duty paid quotations are subject to slight variation due to exchange, ocean freight and insurance fluctuations. Prices are in pence per lb., except where otherwise stated. Grades are expressed as follows:* 1001/2/6 = *grades* 1001, 1002 *and* 1006.

(e-qdp)—Ex-quay duty paid (cifUKdp)—cif UK duty paid (e-i)—Ex-installation (ddp)—Delivered duty paid (e-sUK)—Ex-store UK (ex-wUK)—Ex-warehouse UK (d)—Delivered BM—black masterbatch CBM—cold, black masterbatch CNP—cold, non-pigmented CNS—cold, non-staining COE—cold, oil extended COELC—cold, oil extended, light coloured CO/BM—cold, oil/black masterbatch CPOE—cold, pigmented, oil extended CRE—cold, rosin extended dw—Dry weight HN—high nitrile HNP—high nitrile, powder HP—hot, pigmented HS—high styrene HMW—high mol. wt. LMW—low mol. wt. MHN—medium high nitrile MLN—medium low nitrile MMW—medium molecular weight MN—medium nitrile NS—non-staining TS—total solids RTV—room temp. vulc.

SBR TYPES AND HIGH-STYRENE RUBBER

Ameripol (Goodrich Gulf) (e-qdp

1000/1/6/7	Hot, non-oil ..	22.50
1002/12	,, ,, ..	22.75
1009	,, ,, ..	24.25
1011	,, ,, ..	23.25
1013	,, ,, ..	23.50
1019	,, ,, ..	24.75
1006/12	Hot, crumb ..	23.00
1009	,, ,, ..	25.00
1013	,, ,, ..	24.00
1500/1/2/9/11	Cold, non-oil ..	22.50
1503	,, ,, ..	24.50
4600G2, 4604	,, ,, ..	22.50
1703	COE, 25% oil	19.75
1705	,, ,,	19.50
1707/8	,, 37.5% ,,	18.25
1710/12	,, ,, ,,	18.00
4700	,, 50% ,,	16.75

ASRC (American Synthetic Rubber Corpn.) (e-sUK)

1004/6	Hot, non-oil	22.25
1009	,, ,, ...	24.0
1018	,, ,, ...	24.75
1019	,, ,, ...	24.5
1500/2/7	Cold, non-oil	22.25
1503	,, ,, ...	24.25
1703	COE	20.5
1708	,, ...	18.0
1712	,, ...	17.75
1713	,, ...	16.75
3014	Hot, non-oil	25.75
3105/6	Cold, non-Oil	22.25
3110	,, ,, ...	24.0

Cariflex (Shell Chemical)

		(e-sUK)
S-1000	Hot	22.25
S-1002	,, ...	23.375
S-1006	,, ...	22.25
S-1009/11/13	,, ...	24.0
S-1500/2/9	Cold	22.25
S-1600/2	CBM	19.625
S-1605	,, ...	19.375
S-1606	,, ...	18.75
S-7652	,, ...	20.0
S-1703	COE	19.25
S-1707	,, ...	18.0
S-1709/12	,, ...	17.75
S-1803	COBM	17.875
S-1806	,, ...	16.625
S-1807	,, ...	17.375
S-1808	,, ...	15.25

FR-S (Firestone) (delUK*)

1000/1/4/6/7 and 195	Hot ..	22.50
1500/2 and 146	Cold	22.50
1703 and 173	OE ..	19.11
1710/12 and 184	,, ..	18.00
178	,, ..	18.25
201	,, ..	16.71
1009 UK Specialty		23.06
1012 ,, ,, ...		22.59
1013 ,, ,, ...		23.59
1014 ,, ,, ...		26.18
181 ,, ,, ...		22.50
182 ,, ,, ...		23.29
147 ,, ,, ...		20.94
158 ,, ,, ...		28.00
158-S		27.50

*Import Duty not included

Int. Synthetic Rubber (d)

Intol 1500/2	22.5
Intol 1509	22.5
Intol 1570	23.5
Intol 1006	22.5
Intol 1710	18.0
Intol 1712	18.0
Intol 1778	18.25

ANIC (e-qdp)

1500	22.25
1502	22.25
1708	18.00
1712	17.75
6630	23.25
6632	22.25
6700	16.375

Philprene (Phillips) (d)

1000/6	Hot, non-pig.	22.50
1009	,, ,, ...	24.25
1018	,, ,, ...	26.97
1019	,, ,, ...	26.50
6701	,, ,, ...	24.23
1500/2	CNP	22.50
1503	,, ...	26.27
6630	,, ...	25.18
6632	,, ...	24.23
1601	CP	19.70
1603	,, ...	19.80
1605	,, ...	19.625
1606	,, ...	19.00
1608	,, ...	18.90
1609	,, ...	21.12
6662	,, ...	18.90
6655	,, ...	19.80
1703	COE	20.75
1708	,, ...	18.25
1712	,, ...	18.00
6700	,, ...	18.01
1803	CPOE	18.125
1805	,, ...	16.11
1808	,, ...	16.50
6608	,, ...	15.27
6753	,, ...	15.61
6754	,, ...	15.45
6755	,, ...	17.68

Plioflex (Goodyear) (ex-wUK)

1006	HNP	22.25
1500/2/7/8	CNP	22.25
1006	S	22.75
1703	COE	19.25
1710/12	,, ...	17.75
1773	COELC	19.25
1778	,, ...	18.0
B—6	.....	27.5
B—5	.....	28.0

Polysar (Polymer UK) (e-sUK)

S Hot	22.25
S-630 Hot	22.25
Kryflex 200 Cold	23.5
Krylene	22.25
Krylene NS	22.25
Krylene 602 Cold	22.25
Krynol 651 COE	17.75
Krynol 652 ,, ...	18.0
S-X 371 Process Aid	24.0

Synpol (Texas-US Chemical)

		(e-qdp)
1000/1	Hot	22.25
1002	,, ...	22.47
1006/7	,, ...	22.25
1009	,, ...	22.81
1012	,, ...	22.38
1013/61	,, ...	22.25
X274	,, ...	23.45
8000	,, ...	22.25
1500/02/51	Cold	22.25
1703	COE	19.25
1707/8	,, ...	18.0
1711	,, ...	17.88
1712	,, ...	17.75
8200	,, ...	18.0
8201	,, ...	16.6
8202	,, ...	16.38
8152	CBM	18.6
8151	COBM	18.2
8253	,, ...	15.84
8254	,, ...	15.45
8255	,, ...	14.8
8267	,, ...	16.4

(Masterbatch prices US cents per lb. fas Gulf ports)

SBR LATICES

Copo (Copolymer) (cifUKdp)
(10-ton lots)

2101	(dw)	46.3
X-765	,, ...	40.8
X-800	,, ...	37.2
2102/5	,, ...	38.0

Pliolite Rubber (Goodyear) (d)

2000	40

Latex (dw)

2001/4/5/8	40
5350	40

Pliolite Resin (Goodyear) (d)

101A (dw)	44
150 ,, ...	50
151 ,, ...	35
160 ,, ...	50
170 ,, ...	50

Hycar (B. F. Goodrich) (ddp)

2507 (HS) dw	48

Polysar (Polymer UK) (e-sUK)

Latex, type IV	32.5 TS
Latex, type 722	31.75 TS
(Non-returnable 45-gallon drums)	(e-i)
Latex, type 722	28.75 TS
(bulk quantities)	

Int. Synthetic Rubber (ex-wks)

Intol Latex M23B/R23/F28	22.25
Intol Latex 62A	27.0

Dylex (Koppers Int. CA) (fas)

K-42A/52/51/900	31.6

ACRYLONITRILE TYPES

Butaprene N (Firestone) (cifUKdp)

NL	52.5
NAA	56.25
NF	51.5
NXM	60.18

Chemigum (e-s)

N—1	75
N—3A	52
N—5	52
N—6G/7/8/600X	45

Hycar (British Geon) (UKd)
(500-lb. lots and over)

1001	High Nitrile Hot	52
1041	,, ,, Cold	52
1002	MHN Hot	45
1042	,, Cold	45

Hycar (B. F. Goodrich) (ddp)
(500-lb. lots and over)

1411	HNP	66
1432	MHN (crumb)	64
1072	,, (carboxyl)	66
1312	,, (liquid)	55
1043	MLN	51
1014	Low Nitrile	61

I.C.I. (min., 5-cwt. lots) (UKd)

Butakon A-4051 HN Cold .	52
Butakon A-3051 MN Cold .	45
Butakon A-3002 ,, ,, .	45

Paracril (US Rubber) (dwe-sUK)

18-80	Low Nitrile	61
AJ	,, ,, ...	50
B	MLN	51
BJ	,, ...	51
BLT	,, Cold	51
BJLT	,, ,, ...	51
C	MHN	59
CLT	,, Cold	59
CV	,, (crumb)	63
D	High Nitrile	67
ALT	.....	51
OZO	.....	47

Polysar (Polymer UK) (d)

Krynac 800 MN	45
Krynac 802 LN	45
Krynac 803 MN (low Mooney)	45
Krynac 801 HN	52
Krynac 804 (MN-cross linked)	45

ACRYLONITRILE LATICES

Butaprene N (Firestone) (cifUKdp)

N-300 (dw)	53
N-400 ,, ...	60.5

Chemigum Latex (Goodyear) (d)

200		(dw)	65
235/6	CHS	,, ...	60
245	B	,, ...	52
245 6/7/8	CHS	,, ...	52

Hycar (B.F. Goodrich) (ddp)
(dry weight, drum lots)

1551 High Nitrile	66
1552 MHN	57

Hycar (British Geon) (UKd)
(dry weight, 3 drums and over)

1561	High Nitrile	60
1571	,, ,, (carboxyl)	60
1562	MHN	52
1577	(modified)	52

ACRYLIC TYPES

Hycar (B. F. Goodrich) (ddp)

4021 Slab, 500 lb. and over.	144
4501 Latex, dry weight	96

BUTYL TYPES

Esso (e-sUK)

Regular 035/150/215	21.75
Regular 217/8	21.75
Regular 325	21.75
Non-staining 165	22.75
Non-staining 268	22.75
Non-staining 365	22.75

Polysar (Polymer UK) (e-sUK)

Butyl 100/200/300		21.75
Butyl 301/400	NS	21.75
Butyl 101	NS	26.25
Butyl 402	NS	22.5

Hycar (B. F. Goodrich) (ddp)
(500 lb. and over)

2202 Brominated	68

NEOPRENES

(ddp)

W	(dwdel) ..	42.62
WHV	,, ...	38.5
WRT	,, ...	48.37
WX/GN/GNA	,, ...	44.62
GRT and S	,, ...	45.62
AC	,, ...	57.125
KNR	,, ...	75.62
AC 'M' and 'S'	,, ...	57.125
CG/AD	,, ...	57.125

The above prices refer to neoprene produced in the U.S.A. Prices of neoprene types produced at Du Pont's Maydown, Northern Ireland, plant are as follows:

W	(dwdel)	38.5
WRT	,, ...	44.0
WX	,, ...	40.5

Latices—Dry
(per lb. del, min., 50 lb.)

571	49.75
842A	49.75
572	51.25
601A	51.87
650	54.125
735	51.25
736	51.25
950	58.25
60	51.87
750	51.25
635	53.62

SILICONE RUBBERS

Midland Silicones
(500-lb. lots del)

Stocks	16s. 6d. to 35s.
Pastes	26s. to 35s.
Gums and base stock	36s. to 42s.
Cold-curing silicone rubber	20s. and 23d. 6d.

I.C.I. Silicones

Gums (40-lb. lots del)	39s. 6d.-47s.
Stocks (250-lb. lots del)	22s.-35s.
Pastes (1000-lb. lots del)	27s.6d.-35s.9d.
Silcoset (RTV) (250-lb. lots del)	21s. to 24s.

REINFORCING RESINS AND RUBBERS

I.C.I. (min., 2-ton lots) (UKd)

Butakon S-8551	36.5
Butakon S-7001	33.5

Hycar (B.F. Goodrich) (ddp)

2007 (powder)	42.5

Pliolite (Goodyear) (d)

S—6B	36.5

Polysar (Polymer UK) (e-sUK)

SS-250 HS (bale)	27.25
SS-250 ,, (flake)	27.5
Kryflex 252 HS	25.5
Kryflex 202 (HMW Cold polymerized)	25.75

Cariflex (Shell) (e-sUK)

SP-103	27.75

Cyclite (Durham Raw Materials) 42

HYPALON

(ddp)

20	48
30	60.25
40	50.75

Future Events

Plastics Institute

Midlands Section. — May 10 at the Hotel Metropole, King Street, Leeds, at 11.45-1.30 p.m. and 6-7.45 p.m. The following talks will be given: 'Use of Titanium for Chemical Plant', 'Application of Corrosion Inhibitors to Steam Sytems', and 'Ways and Means of Making Use of the Special Properties of Silicones', by E. T. Adams, M. S. Timms, G. B. Ingram and J. Green.

Increases of Capital

Lambert Plastics Ltd. (688,447). March 30. Capital: £100 in £1 shares. To carry on the business of manufacturers, importers, exporters, hirers, repairers and processors of, and dealers in, plastics substances and materials, etc. The first directors are: Ernest W. Lambert, 185 Leighton Avenue, Leigh-on-Sea; Montague A. R. Jacobs, 1070a London Road, Leigh-on-Sea. Regd. office: 2a Church Street, Rayleigh, Essex.

Unilock Plastics Ltd. (688,247). March 29. Capital: £100 in £1 shares. To carry on the business of manufacturers, importers and exporters of, and dealers in, plastics of all kinds, etc. Regd. office: 157 Victoria Street, S.W.1.

Coin Insulation Materials Ltd. (688,229). March 29. Capital: £1,000 in £1 shares. To carry on the business of manufacturers, producers and processors of, and dealers in, glass fibre and synthetic resin materials of all kinds, plastics modelling and moulding materials, substances and compositions, etc. The directors are: Reginald C. Cooke, Mrs. Ena D. Cooke and Miss Pamela I. Cooke, all of Chisholme, Maybury Hill, Woking, Surrey. Regd. office: 69 St. Johns Road, Woking.

S. Sykes and Sons Ltd. (688,048). March 27. Capital: £2,000 in £1 shares. To carry on the business of manufacturers of, and dealers in, plastics substances, etc. The first directors are: Samuel Sykes, Mrs. Jennie Sykes, Cyril Sykes and Leonara Sykes, all of 29 Western Avenue, N.W.11. Regd. office: 101 Hatton Gardens, E.C.1.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

Silcocell (801,627). Chemical products for use in industry. Imperial Chemical Industries Ltd., Imperial Chemical House, Millbank, London, S.W.1. (Class 1; March 22 1961.)

Loxiol (808,959). Esters of alcohols and organic acids. Bush Beach and Segner Bayley Ltd., Marlow House, Lloyds Avenue, London, E.C.3. (Class 1; March 22 1961.)

Voranol (809,883). Chemical products used in industry. The Dow Chemical Co., City of Midland, State of Michigan, USA. Address for service is c/o W. P. Thompson and Co., 12 Church Street, Liverpool, 1. (Class 1; March 22 1961.)

Silcodyne (812,704). Chemical products for use in industry. Imperial Chemical Industries Ltd., Imperial Chemical House, Millbank, London, S.W.1. (Class 1; March 22 1961.)

Synmastic (812,921). Synthetic resins and chemical products for mixing therewith, all for making up into adhesive compounds for patching holes in vehicle bodies. L. F. Brenner Ltd., 235 Halfway Street, Sidcup, Kent. (Class 1; March 22 1961.)

Linette (805,441). Sheet material made of laminations of plastics and articles made therefrom, all being goods included in Class 17. Formica International Ltd., De La Rue House, 84/86 Regent Street, London, W.1. (Class 7; March 22 1961.)

Dekkopad (805,401). Small domestic utensils and containers, combs and sponges, all made of plastics. Scrubb and Co. Ltd., Wimbledon Factory Estate, Morden Road, Wimbledon, London, S.W.19. (Class 21; March 22 1961.)

NEW COMPANIES

Thermo-Plastic Components Ltd. This is the correct title of a new company wrongly described in this column as 'Thermo-Plastic Co. Ltd'. ('RPW', April 15, 594.)

Rubber-Plas (T. W. Coker and Sons) Ltd. (686,843). March 17. Capital: £1,000 in £1 shares. To carry on the business of manufacturers, workers, welders and fabricators of, and dealers in, plastic materials and synthetic products, moulding and modelling materials, etc. The first directors are: Edward J. M. Coker, 85 Woodpecker Road, New Cross, S.E.14; Thomas W. Coker, 28 Rolt Street, Deptford, S.E.8; Catherine Coker, 28 Rolt Street, Deptford, S.E.8. Regd. office: 85 Woodpecker Road, New Cross, S.E.14.

Printed Pile Fabrics Ltd. (687,094). March 21. Capital: £100 in £1 shares. To carry on the business of printers in all kinds of textiles, fabrics, plastics and the like, etc. The first directors are: Lucien F. Leleu, Attcliffe, Granville Road, St. Margarets Bay, Kent; Margaret Beaumont, Flat 62, 6 Hall Road, N.W.8. Regd. office: Commercial Building, Limekiln Street, Dover.

Southampton Marine Plastics Ltd. (687,047). March 20. Capital: £100 in £1 shares. The first directors are: Bernard A. Muddiman, 9 Underwood Road, Bassett, Southampton; Raymond O. Wedge, 18 Langley Road, Regents Park, Southampton. Regd. office: Vespasian Road, Southampton.

Seaforth Plastics Ltd. (687,101). March 21. Capital: £20,000 in £1 shares. The directors are: Sidney Stein and Mrs. Sadia Stein, both of 23 Chadwick Road, Westcliff-on-Sea, Essex. Regd. office: Watchett Works, Oakhurst Road, Southend-on-Sea, Essex.

Medway Tyre Co. Ltd. (687,079). March 21. Capital: £500 in £1 shares. To carry on the business of dealers in tyres for all kinds of vehicles, etc. The first directors are: Maurice A. R. Hutchinson, 'Redroofs', Sittingbourne Road, Maidstone; Mrs. Winifred M. Hutchinson, 'Redroofs', Sittingbourne Road, Maidstone. Regd. office: 17 Hart Street, Maidstone, Kent.

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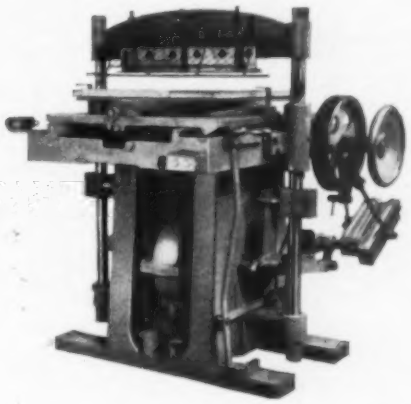

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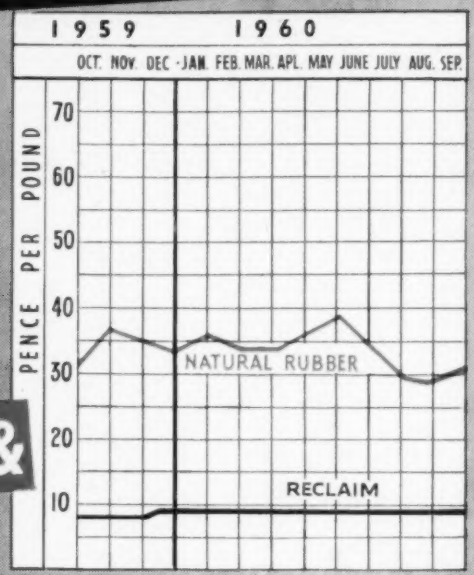

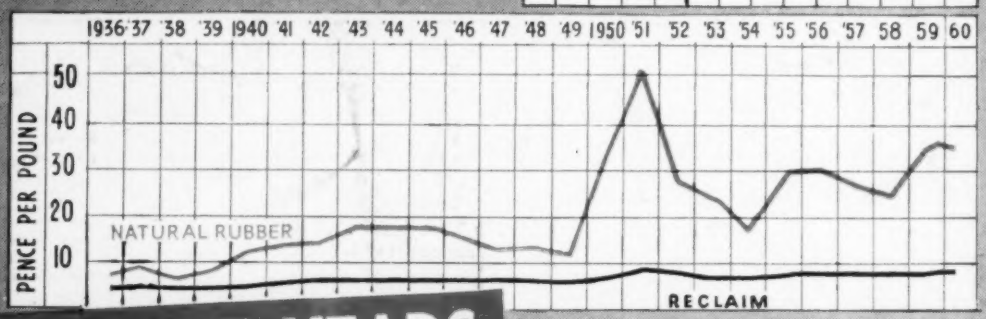

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